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Research Article

### A DESCRIPTIVE STUDY ON PREVALENCE, PATTERN AND COINFECTION OF HEPATITIS VIRUSES IN ACUTE INFECTIOUS HEPATITIS

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**Abstract:**

**Introduction:** There is fluctuation of information with respect to seroprevalence and coinfection of hepatitis infections. Our goal was to decide the greatness, example and coinfection of hepatitis infections in clinically associated cases with intense irresistible hepatitis. **Techniques:** This illustrative examination was led in the Department of Pathology

In Rawalpindi Medical College over a time of 1 year from January 2017 to December 2018. All the se-rum examples taken from subjects (n= 600 in study gathering and n=200 in control gathering) were tried for hepatitis B surface antigen (HBsAg), Immunoglobulin M (IgM) neutralizer against HAV, HCV and HEV utilizing monetarily accessible protein connected immunosorbent examine pack. Serum tests positive for HBs Ag were additionally tried for IgM catch against hepatitis D infection (HDV) by ELISA philosophy. We utilized SPSS Ver.10.0 (SPSS Inc. Chicago, - Illinois) for the factual examination. The methods for ceaseless factors among the gatherings were analyzed utilizing the Student's t-test while extents were tried by Chi-square test.

**Results:** Seroprevalence of intense viral hepatitis was 128/600 (21.3%) and 17/200 (8.5%) in study and control bunch individually ( $p < 0.05$ ). HAV was the commonest cause 50/600 (8.3%) trailed by HCV 33/600 (5.5%), HBV 24/600 (4%) and HEV 21/600 (3.5%). Coinfection rate among the investigation bunch was 11/128 (8.5%) and most extreme coinfection rates were seen with HBV 8/11 (72%). 4/24 (16.6%) of the HBV contaminated cases were coinfecting with HDV. Male transcendence was seen for every one of the markers. In general sex shrewd seropositivity in guys was 81/362 (22.3%) and 47/238 (19%) in females in study gathering while it was 14/121 (11.5%) and 3/79 (3.7%) separately in controls. Ends: Acute irresistible hepatitis is a critical weight on the general public. HAV is the prevalent type of intense viral hepatitis. HBV, HCV and HEV were other driving reasons for intense viral hepatitis. Coinfection of HBV with HDV is the commonest design.

**Key Words:** Seroprevalence, Co-infection, Hepatitis A virus (HAV), Hepatitis B virus (HBV), Hepatitis C virus (HCV), hepatitis D virus (HDV).

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## INTRODUCTION:

Intense viral hepatitis is transcendently brought about by hepatitis A infection (HAV), hepatitis B infection (HBV), hepatitis C infection (HCV), HBV related delta operator or hepatitis D infection (HDV) and hepatitis E infection (HEV). Ailment ranges from asymptomatic or in obvious contaminations to intense fulminant infections.<sup>1</sup> Sub clinical diligent contaminations and quickly progres-sive incessant liver sickness with cirrhosis and hepato-cell carcinoma is the other range of infec-tion.<sup>1</sup> The separation of these infections depends on serological and atomic markers. Intense viral hepatitis is characterized by an intense self constraining infection with serum aspartate amino transferase rise of at any rate five crease as well as clinical jaundice.<sup>2</sup>

HAV is a solitary stranded ribonucleic corrosive (RNA) infection transmitted by feco-oral route.<sup>3</sup> Hepatitis An infection contaminations happen sporadically or as outbreaks.<sup>4</sup> Overt disease is seen just in about 5% of tainted individuals.<sup>5</sup> Chronic bearer state isn't seen with HAV diseases.

Clinical signs comprise of fever, discomfort, anorexia, sickness, spewing, which more often than not die down with the beginning of jaundice.<sup>6</sup> HAV ailment is a self constraining ailment portrayed by complete recovery.<sup>7</sup> Rarely, a quickly deadly fulminant hepatitis may pursue.

Hepatitis B infection is a deoxyribonucleic corrosive (DNA) infection and has a place with Hepadnaviridae family. It is transmitted by parenteral, sexual or perinatal mode. Worldwide more than 300 million people are incessantly contaminated with HBV and 75% among these are in Asia alone.<sup>8</sup> The normal evaluated bearer rate of hepatitis B (HBV) in India is 4.7%.<sup>9</sup> Hepatitis B infection diseases draw a worldwide concern on account of its capability to cause intense and interminable hepatitis (70%), liver cirrhosis (80%) and essential hepatocellular carcinoma.<sup>10</sup>

Hepatitis C infection (HCV) is a solitary stranded ribonu-cleic corrosive infection and is the commonest reason for post transfusion hepatitis.<sup>11</sup> HCV transmission happens by needle stick wounds, transfusion of unscreened blood and through risky sexual practices. It is evaluated that 200 million individuals worldwide are tainted with HCV.<sup>12</sup> About 75% of diseases are sub clinical and uncovered just coincidentally by anomalous liver capacity tests as well as hostile to HCV positivity.<sup>13</sup> Complications incorporate perpetual hepatitis (70%), cirrhosis (20-30%), hepatocellular carcinoma and liver failure.<sup>14</sup>

Approximately 7-8% of HCV positive ladies transmit the infection to their posterity. The rate of transmission is considerably higher among ladies co tainted with HIV.<sup>15</sup>

Hepatitis D infection is a flawed satellite infection, requiring HBV as assistant virus.<sup>16</sup> HDV is transmitted by parenteral, sexual and perinatal courses. Contaminations can happen as concurrent disease with HBV or as super disease of a HBsAg bearer by HDV.<sup>17</sup> HDV contamination can be forestalled by counteractive action of coinfection with HBV or of super contamination with HBV transporter and requires every one of the measures that apply to the aversion of HBV infection.<sup>18</sup>

Hepatitis E infection has a place with the family calciviridae, with single stranded RNA genome, in charge of a considerable extent of instances of enterically transmitted non A non B hepatitis in youthful and moderately aged adults.<sup>19</sup> Epidemics and point source episodes are regular in blustery seasons when flooding prompts sewage tainting of drinking water.<sup>20-21</sup> Mortality from HEV related disease in pregnancy goes between 35-40% and could be as high as 70%.<sup>22</sup>

The predominance of etiology of viral hepatitis still stays begging to be proven wrong in creating and created countries.<sup>23-25</sup> There is inconstancy of information with respect to pervasiveness of various markers of hepatitis. There are not very many Indian investigations absolutely delineating the coinfection rates with different hepatitis infections. Exact information on seroprevalence of various hepatitis infections will help evaluate the weight effectively and specialists can in like manner strategize the preventive measures.

## MATERIALS AND METHODS:

This elucidating study was led in the department of pathology at Rawalpindi Medical College

which is a tertiary care hospital, over a time of one year from January 2017 to December 2018. Subjects were partitioned into 2 gatherings. Gathering 1 was the investigation gathering of 600 patients with clinically suspected infectious- hepatitis going to the outpatient branch of Services hospital lahore. Gathering 2 was the control gathering of 200 age and sex coordinated patients appearing clinical proof of intense irresistible hepatitis. 200 patients going to different outpatient divisions at our medical clinic were enlisted as controls as just these many were tantamount as indicated by clinical and research center criteria. We could enlist 600 cases and 200 controls in the investigation span.

**Inclusion criteria for cases:**

- Recent beginning of jaundice (<6 months) characterized by serum bilirubin level >2.5 mg/dl and additionally increment in serum transaminase >5 times the maximum furthest reaches of typical.
- Fever without constant liver sickness or previous history of jaundice.

**Exclusion criteria for cases:**

- History of constant liver malady or previous history of jaundice with term of ailment over a half year.
- Acute greasy liver of hepatitis or alcoholic hepatitis or intrahepatic cholestasis.

Routine blood tests got in the serology segment of Department of Microbiology from patients associated with intense irresistible hepatitis were investigated. The sera were isolated and put away solidified ( $-70^{\circ}\text{C}$ ) until tried for the viral markers. All the serum tests taken from subjects (think about

what's more, control gathering) were tried for HBsAg utilizing monetarily accessible protein connected immunosorbent measure packs.

1. Antibody to hepatitis A infection (IgM hostile to HAV) (ELISA; Biokit®, Barcelona, Spain).
2. Hepatitis B infection surface antigen (HBsAg) (ELISA; Biokit®, Barcelona, Spain).
3. Antibody to hepatitis C infection (IgM Anti HCV) (ELISA; Express Bio Life Science Products, USA).
4. Antibody to hepatitis E infection (IgM hostile to HEV) (ELISA; ORGENICS Ltd)

Educated consent- and institutional survey board endorsement was taken from morals advisory group for the examination bearing convention number MIC 07/312.

We utilized SPSS Ver.10.0 (SPSS Inc. Chicago, -Illinois) for the factual investigation. The methods for nonstop factors were analyzed utilizing the Student's t-test and all out factors were compared- utilizing the Chi square test and the Fisher's exact- test, as suitable. A p estimation of under 0.05 was viewed as noteworthy.

**RESULTS:**

The examination bunch included 362 male and 238 female patients. The general male to female proportion was 1.5:1 and along these lines a male prevalence was found in study gathering. The control

gathering (n = 200) involved 121 guys and 79 females with generally male to female proportion of 1.5:1. The examination and control bunch were separated age shrewd, i.e., 0-10 years, 11-20 years, 21-30 years, 31-40 years and >40 years. The level of guys was not different among cases and controls ( $P = 0.125$ ). The mean age in the examination bunch was  $20.2 \pm 15.2$  years while in the control bunch it was  $19.65 \pm 14.8$  years. The mean period of study and control bunch was not extraordinary ( $P = 0.46$ ).

Table 1 demonstrates Age and Sex Distribution in Study and Control Groups

In the investigation gathering, a sum of 600 examples were tried for different viral markers. Out of 600, 472 (78.7%) were negative, though 128 (21.3%) were certain for viral markers while in the control bunch a sum of 200 examples tried for different viral markers. Out of 200, 183 (91.5%) were negative though 17 (8.5%) were certain for viral markers. The vary ence between the general seroprevalence in the examination gathering (21.3%) and the control gathering (8.5%) was factually huge ( $p < 0.05$ ). In the investigation gathering, the general seroprevalence for IgM hostile to HAV was 50/600 (8.3%) when contrasted with 4/200 (2%) in the control gathering. The difference was factually noteworthy ( $p < 0.05$ ). The general seroprevalence of HBsAg in the examination bunch was 24/600 (4%) when contrasted with 5/200 (2.5%) in the control gathering, the thing that matters was measurably not significant. The general seroprevalence of IgM hostile to HCV in the examination bunch was 33/600 (5.5%) while that in the control bunch was 3/200 (1.5%), the difference was measurably critical ( $p < 0.05$ ). The general seroprevalence of IgM against HEV in the examination bunch was 21/600 (3.5%) when contrasted with 5/200 (2.5%) in the control gathering. The thing that matters was measurably not critical ( $p > 0.05$ ). In general Seroprevalence of intense viral hepatitis in Study and Control Groups is exhibited in Table 2.

With the sex insightful seropositivity of various viral markers a checked variation was watched the predominance rates for IgM hostile to HAV in guys and females was 32/362 (8.8%) and 18/238 (7.5%) individually in the examination gathering. HBsAg seropositivity was discovered comparative in guys 15/362 (4.1%) and females - 9/238 (3.7%). So also, IgM hostile to HCV demonstrated a seropositivity of 21/362 (5.8%) in guys and 12/238 (5%) in females and IgM against HEV demonstrated a seropositivity of 13/362 (3.4%) in guys and 8/238 (3.3%)

**Table 1: Age and Sex Distribution of subjects in Study and Control Groups**

Age Group	Study Group (n=600)			Control Group (n=200)		Total l (%)
	Male (%)	Female (%)	Total (%)	Male (%)	Female (%)	
0-10 yrs	133 (62.1)	81 (37.8)	214 (35.7)	40 (56.3)	31 (43.6)	71 (35.5)
11-20 yrs	62 (56.3)	48 (43.6)	110 (18.3)	21 (58.3)	15 (41.6)	36 (18)
21-30 yrs	87 (66.9)	43 (33)	130 (21.6)	32 (74.4)	11 (25.5)	43 (21.5)
31-40 yrs	34 (50.7)	33 (49.2)	67 (11.1)	15 (68.1)	7 (31.8)	22 (11)
>40 yrs	46 (58.2)	33 (41.7)	79 (13.1)	13 (46.4)	15 (53.5)	28 (14)
Total	362 (60.3)	238 (39.6)	600	121 (60.5)	79 (39.5)	200
	M:F	1.5:1		M:F	1.5:1	

**Table 2: Overall Seroprevalence of acute viral hepatitis in Study and Control Groups**

Serological markers	Study Group			Control Group			p value*
	Male (n=362)(%)	Female (n=238) (%)	Total (n=600) (%)	Male (n=121) (%)	Female (n=79) (%)	Total (n=200) (%)	
IgM anti HAV	32 (8.8)	18 (7.5)	50 (8.3)	3 (2.4)	1 (1.2)	4 (2)	0.002
HBsAg	15 (4.1)	9 (3.7)	24 (4)	3 (2.4)	2 (2.5)	5 (2.5)	0.183
IgM anti HCV	21 (5.8)	12 (5)	33 (5.5)	3 (2.4)	0	3 (1.5)	0.018
IgM anti HEV	13 (3.4)	8 (3.3)	21 (3.5)	5 (4.1)	0	5 (2.5)	0.735
Total	81 (22.3)	47 (19)	128 (21.3)	14 (11.5)	3 (3.7)	17 (8.5)	0.007

in females. In general seropositivity in guys was 81/362(22.3%) and in females was 47/238(19%). The general seropositivity among guys in the control gathering (n=200) was 14/121(11.5%), while that in females was just 3/79(3.7%). IgM hostile to HAV was sure in 3/179(2.4%) of guys and 1/79(1.2%) of females. HBsAg was sure in 3/121(2.4%) of guys and 2/79(2.5%) of females. The seropositivity among guys for IgM against HCV was 3/121(2.4%) and for IgM hostile to HEV was 5/121(4.1%). None of the females were sure for IgM against HCV and IgM hostile to HEV.

In study bunch among 0-10 years matured kids a sum of 214 kids were tried. 36/214(16.8%) were sure for IgM hostile to HAV, 11/214(5.1%) for IgM against HCV, 6/214(2.8%) for HBs Ag and 2/214 (0.9%) for IgM against HEV.

In control bunch in 0-10 years old 71 kids were tried. Each of the four markers were similarly dispersed - 2/71(2.8%) in the gatherings. 11 (8.5%) out of 128 positive (21.3%) examine subjects were observed to be coinfectd. The greatest number of coinfections was with HBV.HBV coinfection was found in 8/11 (72%) cases pursued by HCV 2/11 (18%) and HAV 1/11 (9%). Out of 24 cases positive for HBsAg, 8

cases (33.3%) were observed to be coinfecting. Out of these 8 cases, 4 cases (16.6%) were coinfecting with HDV and 2 with HCV (8.3%) and 1 each with HAV and HEV (4.1%). In our investigation, 2 instances of coinfection (8.3%) supposedly occurred among HBV and HCV. No coinfections were found in the control gathering. There were 15 pregnant patients in the

investigation gathering and none were certain for any of the tried viral markers. Figure 1 portrays coinfection design among various infection.

### DISCUSSION:

Pakistan has a broad clinical issue of intense viral hepatitis. Acute viral hepatitis in Pakistan is to a great extent ascribed to hepatotropic infections.

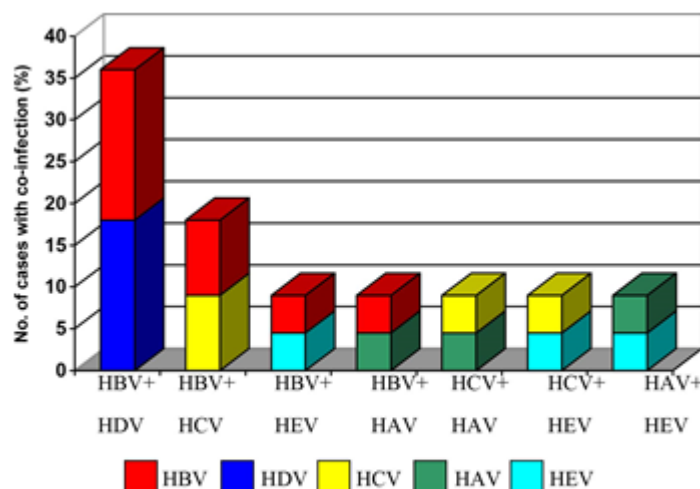


Figure 1: Co-infection pattern among different virus.

Different assessment exists over the seroprevalence information of different viral markers in age, sex gatherings and co contamination status. [25, 27-31]

The all out infective pathology was serologically identified in 128 (21.3%) out of 600 examples associated with intense irresistible hepatitis in the examination gathering while 17 (8.5%) of the 200 examples in control gathering. [27-29] Zahid et al (2006, ) considered 3495 patients with intense speculated hepatitis and found the all out infective pathology as 35.1%. The seroprevalence for IgM against HAV, HBsAg, IgM hostile to HCV and IgM HEV was 11.4%, 9.1%, 1.1% and 14.5% separately.

The seroprevalence declined from 78.3% in 2000 to 38.3% for 2002. The seroprevalence rate additionally diminished from 35.1% in 2006 to 21.3% in our examination. [27-29]

Out of the all out infective cases (21.3%), in the investigation gathering, the most extreme seroprevalence was of IgM against HAV (8.3%), trailed by IgM hostile to HCV (5.5%), HBsAg (4%) and IgM against HEV (3.5%).

In the control gathering, the general seropositivity for various viral markers in the control bunch was 2% for IgM hostile to HAV, 2.5% for HBsAg, 2.5% for IgM

against HEV and 1.5% for IgM against HCV. Amid the examination time frame, there was no intense viral hepatitis flare-up detailed in the area.

A few creators have contemplated the example of IgG hostile to HAV in sound pop-ulation. [32-33] Population studies demonstrate that 33% of the general population live underneath the neediness line with poor sanitation and low financial status which adds to expanded powerlessness to contaminations.

Our examination showed a general seroprevalence rate for HBV as 4% in the investigation gathering while 2.5% in the control gathering. The HBsAg seroprevalence recorded by various creators fluctuated from 8 to 42.5% respectively. [27-29, 34] The decreased pervasiveness rates in our examination could be credited to combination of HBV inoculation into Universal vaccination program and free accessibility of immunization. Quality checks in blood donation center by stringent screening practices and network mindfulness crusades demonstrated crucial in infection control.

The Seroprevalence rate of HBsAg when all is said in done populace in our examination was 2.5%. Different investigations have recorded the seroprevalence rate of HBsAg all in all populace



somewhere in the range of 0.97 and 9.5%.<sup>35,36</sup> Overall HBV bearer rate in has not changed amid the most recent decade, in spite of the fact that the transporter part has expanded by almost 5 million, because of an expansion in the complete populace of the country.<sup>37</sup>

The investigation recorded a general seroprevalence rate of HCV as 5.5% in the examination gathering and 1.5% in the control gathering. Seroprevalence of IgM against HCV recorded by various creators went from 3% to 12%.<sup>25,27,29,30</sup> HCV seropositivity patterns from 1997 to 2002 demonstrated a continuous decrease from 12% to 3.3% with an expanding pattern in most recent couple of years.<sup>25,27, 29, 38</sup> Professional blood gifts were an acknowledged practice until 1997.<sup>38</sup> This boycott reduced the transmis-sion of HCV through unscreened blood gifts. <sup>38-39</sup> Unsafe infusing rehearses, intravenous medication misuse and risky sex rehearses, all contributorily affect the general seroprevalence of HCV.<sup>40</sup> The seropositivity rate of IgM hostile to HCV among the all inclusive community in our investigation (1.5%) was practically identical with different examinations (1.03-1.7%).<sup>35,41</sup> Pahuja et al. found HCV seroprevalence of 0.66% in medical clinic based investigation with 4014 subjects.<sup>41</sup>

The seroprevalence rate of hostile to HEV IgM in our examination was 3.5% while in the control bunch it was 2.5%. No episode of intense hepatitis E was accounted for amid the investigation time frame . Scarcely any creators have announced high pervasiveness rates for hostile to HEV IgM amid late years.<sup>27,30</sup> However, our examination demonstrated similarly low preva-lence rates. This could be clarified by no revealed episode of hepatitis amid the examination time frame. Also, our clinic takes into account pediatric- patients and over half of the patients were in the pediatric age gathering. HEV contamination is everyday citizen in youthful grown-ups and less number of grown-ups was incorporated into our examination.

### CONCLUSIONS:

Hepatitis infections remain a noteworthy etiology for intense viral hepatitis. Both enterically transmitted and parenterally transmitted hepatitis infections are an issue contributing altogether to ailment load. HAV and HEV are normal reasons for enterically transmitted intense viral hepatitis. Each of the four hepatitis infections are transcendently contaminating male patients. HBV and HCV are normal reasons for parenterally transmitted intense viral hepatitis. In larger part of cases coinfection among HBV and

HDV happen together. As a large portion of the instances of intense viral hepatitis are preventable, fitting measures ought to be attempted to constrain their spread.

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