

# The Effects of Blood Groups, Sex, Marital Status, Residential Status, Ethnicity, Income and Age on The Prevalence of Hepatitis in The Patients Visiting Victoria Hospital, Bahawalpur

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**Abstract.-** Out of 1580 patients visited Victoria Hospital, Bahawalpur, 200 patients who were suffering from hepatitis were selected during 2002. In these patients, data about blood groups, sex, marital status, residential status, ethnicity, income and age was recorded. The results were presented as a percentage and difference between percentages was compared by chi -squared test. Overall prevalence of hepatitis was 12.7%, whereas the prevalence of hepatitis was 41.5% in B<sup>+</sup> blood group and 88.5% in Rh<sup>+</sup> group. The prevalence of hepatitis was significantly different ( $P < 0.001$ ) in different blood groups. It was found that sex had no effect on the prevalence of hepatitis ( $P > 0.05$ ) whereas it was higher in married as compared with unmarried group. The prevalence of hepatitis in different ethnic groups showed that it was higher in Pathan (18.5±0.01%) and lower in Malik (6.5±0.01%) and prevalence was significantly different ( $P < 0.001$ ) in different ethnic groups. The results about residential status revealed that the prevalence of hepatitis was higher ( $P < 0.001$ ) in rural population (70.0±0.3%) as compared with urban population (30.0±0.3%). Age-wise distribution of the prevalence of hepatitis showed that it was maximum in age groups of ≤40 (28.5±0.01) and ≤50 (25.5±0.01). Moreover, the prevalence of hepatitis was significantly different in different age groups ( $P < 0.001$ ). It was found that hepatitis was significantly higher ( $P < 0.001$ ) in low-income group (49.3%) as compared to middle and high income groups. In conclusion, the results of the present study demonstrate that the overall prevalence of hepatitis in this data was 12.7%. The prevalence of this condition was higher in B<sup>+</sup> blood group, married patients, patients belonging to rural areas, Pathan and lower income group.

**Key words:** Prevalence, Hepatitis, Bahawalpur, Ethnicity, Income

## INTRODUCTION

Hepatitis is the inflammation of the liver that results in damage to hepatocytes with subsequent cell death (Davidson *et al.*, 1999). The viral hepatitis has been known to cause liver damage such as inflammation and liver necrosis (Zuckerman, 1990). Viral hepatitis is a systemic disease primarily involving the liver. Hepatitis can be caused by the bacterial or viral infection, with parasites, chemicals (alcohol or drug), toxins or immune diseases. It can be short term (acute), long term (chronic), or life threatening (fulminate). So far we know seven hepatotropic viruses, the viruses of hepatitis A (HAV), B (HBV), C (HCV), D (HDV), E (HEV), G (HGV) and transfusion-transmitted virus (TTV) (Ehrmann and Krc, 2000).

The histological appearance in hepatitis is generally classified as acute, fulminant, carrier state

and chronic hepatitis and it is marked by non-specific symptoms like malaise, anorexia nausea, low-grade fever, headache, muscle aches, distaste for cigarette, coffee and specific symptoms like jaundice develops. Urine is dark coloured and stools are clay coloured Liver becomes slightly enlarged and it becomes deeper red than normal. Hepatocytes are swollen and granular. Chronic state is defined as the continuation of hepatic inflammation and necrosis for longer than six months and is usually occur by HBV and HCV (Davidson *et al.*, 1999; Robbins *et al.*, 1999). Hepatitis A is relatively unusually in nations with developed sanitation systems such as United States. Children are most commonly affected (Brender, 2001).

The prevalence of hepatitis B is over 10% in the Asia- pacific region and two thirds of the 350 million people in the world who are chronically infected with hepatitis B infection live in this region (Chen *et al.*, 2000; Farrel and Liaw, 2000). Hepatitis C is prevalent worldwide (Kamal, 2000). Similarly 170 million of the world population is suffering

from hepatitis C (WHO, 1990). The prevalence of chronic hepatitis C in the Asia-pacific region is variable between 4% to 12% (Takahashi *et al.*, 1993).

Hepatitis A and E viruses are transmitted orally (Levinson and Jawetz, 1998). Hepatitis B, C and D virus are transmitted through contaminated blood transfusion, surgery, surgical instruments, dental surgery and excessive dental consultations, sexual contacts, drug abuses, sharing of the household items such as razors, tooth brushes and shaving from the barber (Seeger and Mason, 2000; Kamal, 2000). The prevalence of Hepatitis B and C infection is high in Pakistan and nation wide efforts are required to identify people who may have been infected with HBV and HCV (Qasmi *et al.*, 2000). The highest prevalence (28%) of HCV has been reported in Egypt (Armstrong *et al.*, 2000).

The literature survey indicated that work on the prevalence of hepatitis with respect to different parameters has not been carried out in Pakistan. So, the main objectives of this study were to determine the prevalence of hepatitis and to elucidate its relationship with blood groups, sex, marital status, ethnicity, age and income in the patients visiting Victoria Hospital Bahawalpur.

## MATERIALS AND METHODS

The Ethical Committee of the Institute approved the protocol for the present study. This study was designed to investigate the prevalence of Hepatitis in Bahawalpur and surrounding areas Victoria Hospital Bahawalpur.

The validity of this data was confirmed by personal interviews of randomly selected individuals by obtaining information about their blood groups that was determined by the blood group test of the patient, sex, marital status, residential area (urban/rural), ethnicity, age group and income group. Data collected for blood groups was analysed with respect to Rh factor and ABO alleles. In case of Rh factor 177 patients had a Rh<sup>+</sup> blood group whereas, 23 were Rh<sup>-</sup>. In case of ABO alleles, the number of patients with A (n=52), B (n=83), AB (n=19) and O (n=46) and in case of different ABO blood group, the number of patients with A<sup>+</sup> (n=41), A<sup>-</sup> (n=11), B<sup>+</sup> (n=78), B<sup>-</sup> (n=5),

AB<sup>+</sup> (n=16), AB<sup>-</sup> (n=3), O<sup>+</sup> (n=13), and O<sup>-</sup> (n=8) was calculated. The data included both males (n=113) and females (n=87).

The marital status of the patients was recorded and the number of the married (n=175) and unmarried (n=25) patient was sorted out. All the ethnic groups of patients were recorded and then divided into seven main ethnic groups, Arain (n=33), Bhatti (n=25), Jutt (n=18), Malik (n=13), Pathan (n=37), Rajput (n=27) and Syed (n=31). On the basis of residential status, the patients were divided into urban (n=60) and rural (n=140).

On the basis of age, this data was divided into five age groups, these were  $\leq 20$  (n=19),  $\leq 30$  (n=35),  $\leq 40$  (n=57),  $\leq 50$  (n=51) and  $\geq 50$  (n=38). The family income of the individuals varied from Rs. 3,000 to Rs. 10,000 per month. On the basis of monthly income data was divided into three groups. These groups were  $\leq 3,000$  (n=99),  $\leq 5,000$  (n=69), and  $> 10,000$  (n=32). Income groups of  $\leq 3,000$  (n=99), was included in low income group, individuals with income  $\leq 5,000$  (n=69) was included in middle income group and individuals with income  $\geq 10,000$  (n=32) were included in high-income group.

The data collected for various parameters was analysed by routine statistical methods. The statistical analysis includes calculation of percentage and SE (standard error of percentage) and application of chi-squared test for comparison of percentages.  $P < 0.05$  was taken as statistical significance.

## RESULTS

The prevalence of hepatitis in the population with respect to Rh factor was shown in Table I. The prevalence of hepatitis in Rh<sup>+</sup> blood group was  $88.5 \pm 0.2$  and in Rh<sup>-</sup> blood group it was  $11.5 \pm 0.2$ . It has been found that the prevalence of hepatitis in Rh<sup>+</sup> blood group was significantly higher as compared to Rh<sup>-</sup> blood group ( $\chi^2 = 118.5$ , DF = 1,  $P < 0.001$ ).

Table II indicates the prevalence of hepatitis in patients having different ABO blood groups. It was found that the prevalence of hepatitis in B blood groups was  $41.5 \pm 0.02$  followed by A blood group with value of  $26.0 \pm 0.02$ , AB blood group

9.5±0.02 and O blood group 23.0±0.02. These results showed that the prevalence of hepatitis was significantly higher in B blood group as compared to all other blood groups ( $P < 0.001$ ,  $\chi^2 = 41.4$ ,  $DF = 3$ ).

**Table I.- Prevalence of hepatitis in patients visiting Victoria Hospital, Bhawalpur having different Rh factors (n=200).**

Rh factor	No. of individuals	%±SE
Rh <sup>+</sup>	177	88.5±0.2
Rh <sup>-</sup>	23	11.5±0.2

$P < 0.001$ ;  $\chi^2 = 118.5$ ;  $DF = 1$

**Table II.- Prevalence of hepatitis in patients visiting Victoria Hospital, Bhawalpur having different ABO blood groups (n=200).**

Blood groups	No. of individuals	%±SE
A	52	26±0.02
B	83	41.5±0.002
AB	19	9.5±0.02
O	46	23±0.02

$P < 0.001$ ;  $\chi^2 = 41.4$ ;  $DF = 3$

**Table III.- Prevalence of hepatitis in patients visiting Victoria Hospital, Bhawalpur having different ABO alleles and Rh factors (n=200).**

Blood groups	No. of individuals	%±SE
A <sup>+</sup>	41	20.5±0.01
A <sup>-</sup>	11	5.5±0.01
B <sup>+</sup>	78	39.0±0.01
B <sup>-</sup>	5	2.5±0.01
AB <sup>+</sup>	16	8.0±0.01
AB <sup>-</sup>	3	1.5±0.01
O <sup>+</sup>	38	19.0±0.01
O <sup>-</sup>	8	4.0±0.01

$P < 0.001$ ;  $\chi^2 = 187$ ;  $DF = 7$

The results regarding the prevalence of hepatitis in patients having different ABO blood groups and Rh factor are shown in Table III. It has been found that the prevalence of hepatitis in B<sup>+</sup> blood group was 39.0±0.01 it was 2.5±0.01 in B<sup>-</sup> blood group, 20.5±0.01, 5.5±0.01, 8.0±0.01, 1.5±0.01, 19.0±0.01 and 4.0±0.01 in A<sup>+</sup>, A<sup>-</sup>, AB<sup>+</sup>, AB<sup>-</sup>, O<sup>+</sup> and O<sup>-</sup> blood groups respectively.

According to the results of this study the prevalence of hepatitis was higher in B<sup>+</sup> (39%) and it was lower (1.5%, 2.5%) in AB<sup>-</sup> and B<sup>-</sup> blood groups. Moreover, it was found that the prevalence of hepatitis was different in different blood groups significantly ( $\chi^2 = 187$ ,  $DF = 7$ ,  $P < 0.001$ ).

Table IV describes the sex wise prevalence of hepatitis in males (n = 113) and females (n = 87) patients. It was found that the maximum prevalence of hepatitis in male was 56.5±0.3 and in female it was 43.5±0.3. These results showed that sex did not have any effect on the prevalence of hepatitis in this population ( $\chi^2 = 3.38$ ,  $DF = 1$ ,  $P > 0.05$ ).

Table V indicates the distribution of hepatitis with relation to marital status. It was found that the distribution of hepatitis in married patients was 87.5±0.2 and in unmarried patients it was 12.5±0.2. It has been found that the prevalence of hepatitis was significantly higher in married patients as compared to unmarried patients ( $\chi^2 = 112.5$ ,  $DF = 1$ ,  $P < 0.001$ ).

**Table IV.- Prevalence of hepatitis in patients visiting Victoria Hospital, Bhawalpur having different sex (n=200).**

Sex	No. of individuals	%±SE
Male	113	56.5±0.3
Female	87	43.5±0.3

$P < 0.05$ ;  $\chi^2 = 3.38$ ;  $DF = 1$

**Table V.- Prevalence of hepatitis in patients visiting Victoria Hospital, Bhawalpur having different marital status (n=200).**

Marital status	No. of individuals	%±SE
Married	175	87.5±0.2
Unmarried	25	12.5±0.2

$P < 0.001$ ;  $\chi^2 = 112.5$ ;  $DF = 1$

The prevalence of hepatitis in different ethnic group was shown in Table VI. According to these results, the percentage of patients suffering from hepatitis in Arain was 16.5±0.01 whereas, for Bhatti it was 12.5±0.01, Jut 9.0±0.01, Malik 6.5±0.01, Pathan 18.5±0.01, Rajput 13.5±0.01, Syed 15.5±0.01 and for Miscellaneous, it was 8.0±0.01. It

has been found that prevalence of hepatitis in Pathan was higher as compared to other ethnic groups and it was lower in Malik. Moreover, the results of the present study showed that the prevalence of hepatitis in different ethnic groups was significantly different from one another ( $\chi^2 = 38.6$ , DF = 6,  $P < 0.001$ ).

**Table VI.- Prevalence of hepatitis in patients visiting Victoria Hospital, Bhawalpur having different ethnic groups (n=200).**

Ethnic group	No. of individuals	%±SE
Arian	33	16.5±0.01
Bhatti	25	12.5±0.01
Jatt	18	9.0±0.01
Malik	13	6.5±0.01
Pathan	37	18.5±0.01
Rajput	27	13.5±0.01
Syed	31	15.5±0.01
Miscellaneous	16	8.0±0.01

$P < 0.001$ ;  $\chi^2 = 38.6$ ; DF = 7

The result about residential status and prevalence of hepatitis are presented in Table VII. It was found that the prevalence of hepatitis was higher (70.0±0.3) in rural population as compared to urban population (30.0±0.3). This difference in prevalence of hepatitis in urban versus rural population was highly significant ( $\chi^2 = 32$ , DF = 1,  $P < 0.001$ ).

The results showing the effect of age on the prevalence of hepatitis were depicted in Table VIII. These results showed that the prevalence of hepatitis was maximum in age group  $\leq 40$  and  $\leq 50$  with percentage of 28.5±0.01 and 25.5±0.01 respectively, which were followed by age groups of  $\leq 20$ ,  $\leq 30$  and  $\geq 50$  with percentage of 9.5±0.01, 15.0±0.01 and 19.0±0.01 respectively. These results showed that age had a highly significant effect on the distribution of hepatitis ( $\chi^2 = 21$ , DF = 4,  $P < 0.001$ ).

The results regarding the effect of income on the prevalence of hepatitis were shown in Table IX. The maximum prevalence of hepatitis was in the lowest income group that is  $\leq 3,000$  (49.3±0.01). It was found that prevalence of hepatitis was significantly lower in middle-income groups having

income  $\leq 5,000$  (34.5±0.01) as compared to lower income groups and higher income groups. Prevalence of hepatitis was lowest in higher income groups having income  $\geq 10,000$  (16.0±0.01). These results showed that hepatitis was more prevalent in lower income group as compared to middle and high income groups ( $\chi^2 = 119.4$ , DF = 2,  $P < 0.001$ ).

## DISCUSSION

The objectives of this study were to determine the prevalence of hepatitis and to reveal its relationship with blood groups, marital status, residential status, ethnicity, age and income in the patients visited Victoria Hospital Bahawalpur during 2002.

The results regarding the effect of Rh and ABO blood groups on the prevalence of hepatitis (Tables I-III) showed that it was more frequent in Rh-positive blood group (88.5±0.2). This could be due to the higher proportion of Rh-positive population in Asia as compared to West as revealed by Mian and Farooq (1999).

The results about the prevalence of hepatitis in different blood groups (Table II) indicate that the distribution of hepatitis is more in the individuals having B blood group (41.5%) than other blood groups (A=26%, AB=9.5% and O=23.5%). These results are in complete agreement with that of the earlier study of (Ahmad, 1983) who has reported that particular blood group may predispose an individual to a certain disease in some unknown way. Similarly on the basis of Rh factor (Table III) it was found that the prevalence of this condition was maximal (39.0%) in B positive blood group.

According to the results, showing the effect of sex on the prevalence of hepatitis (Table IV), it was found that sex had no effect on the hepatitis. These results of the present study are in complete agreement with the earlier work of (Shah *et al.*, 2002) who have reported that the prevalence of chronic hepatitis was equal in males and females.

The results of present study regarding to marital status (Table V) indicates the prevalence of hepatitis is significantly higher in married patients (87.5±0.2) as compared to unmarried (12.5±0.2). According to Park (1997) marital status can be a risk factor for some diseases. The results of the

present study contradict the earlier reports of (Osmond *et al.*, 1993), they have shown that the hepatitis is more frequent in married patients. Sexual transmission is also the risk factor of hepatitis B and C. Transmission is associated with longer duration of the relationship, increased frequency of sexual contact. The other factors for transmission of blood pathogens in the sexual partner could be sharing of household, like tooth brushes, blade for under shave, under garments, hair combs and tooth packs (Kaldor *et al.*, 2000).

The term "ethnic" often refers to these resultant groups, which may differ by culture, religion and race (Friedman *et al.*, 1997). The human population began as a relatively small population that gradually split into small breeding groups. According to our results the percentage of hepatitis is higher in Pathan group (18.5±0.01) and it is lower in Malik (6.5±0.01). There is no data available for direct comparison. However, the results of this study contradict the recent report of (Farhat, 2002) who had reported higher prevalence in Arain (18%). The reason for this contradiction could be the small size of the data, different environmental factors, diet and social practices. These differences may also be related to variable genetic background of the patients.

**Table VII.- Prevalence of hepatitis in patients visiting Victoria Hospital, Bhawalpur having different residential status (urban/rural (n=200)).**

Residential status	No. of individuals	%±SE
Urban	60	30.0±0.3
Rural	140	70.0±0.3

P<0.001;  $\chi^2=32.2$ ; DF=1

The results about residential status and prevalence of hepatitis (Table VII) showed that the incidence of hepatitis was higher in rural population (70.0±0.3) as compared to urban population (30.0±0.3). It may be due to poor health facilities, unhygienic conditions and lack of awareness in rural areas. Our results confirmed the earlier work of (Shah *et al.*, 2002) who reported that the actual prevalence of chronic hepatitis in the rural population is higher as compared with urban population. In the population of our country, the

non-disposable blade is used for shaving and cutting and shaving of scalp hairs, which may be responsible for increasing prevalence of hepatitis. Shaving is a potential risk of hepatitis transmission (Tumminelli *et al.*, 1995). Though mostly the disposable blade is used but the chamber in which blade got fixed, always remains in direct contact with the skin of the every customer and is never disinfected.

**Table VIII.- Prevalence of hepatitis in patients visiting Victoria Hospital, Bhawalpur belonging to different age groups (n=200).**

Age group	No. of individuals	%±SE
≤ 20	19	9.5±0.01
≤ 30	35	15.0±0.01
≤ 40	57	28.5±0.01
≤ 50	51	25.5±0.01
≥ 50	38	19.0±0.01

P<0.001;  $\chi^2=21.3$ ; DF=4

**Table IX.- Prevalence of hepatitis in patients visiting Victoria Hospital, Bhawalpur belonging to different income groups (n=200).**

Income group	No. of individuals	%±SE
< 3,000	99	49.3±0.01
< 5,000	69	34.5±0.01
< 10,000	32	16.0±0.01

P<0.001;  $\chi^2=182$ ; DF=2

According to the results showing effects of age on the prevalence of hepatitis (Table VIII), it was found that the hepatitis incidence increases with age. It was more common in age group ≤40 (28.5±0.01) and ≤50 (25.5±0.01). The results of this study are in complete agreement with the earlier work of (Shah *et al.*, 2002) who have shown that the high prevalence of hepatitis was among the age group of 40 to 49. The patients among these age groups are exposed highly to risk factors like surgery, without proper screening blood transfusion, multiple injections, razor trauma of shaving refilling vials of locals anesthetics and the use of contaminated dental instruments (Kao and Chen, 2000).

The effect of income on the prevalence of

hepatitis was also studied (Table IX). It was found that prevalence of hepatitis was higher in low-income group  $\leq 3,000$  ( $49.3 \pm 0.01$ ) as compared to middle and high-income groups. This difference may be due to their different life style and dietary habits.

In conclusion, it was found that overall prevalence of hepatitis was 12.7% in this sample. Moreover, this study demonstrates that hepatitis is more prevalent in married individuals, in age group of 40 and high in rural population. Sex had no effect on hepatitis. The prevalence of hepatitis varies in different ethnic groups, family income and different blood groups, due to different feeding habits, environmental and genetic factors.

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