

## Prevalence of Hepatitis B in Blood Groups and Level of Education of Blood Donors in Al-Najaf Governorate

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Hepatitis B virus (HBV) infection is a global problem. When the virus replicates in the hepatocytes, the liver functions will be impaired and the infection will spread throughout the liver. Blood and blood products contain HBV, and therefore the virus could be transmitted via blood transfusion, (by blood groups). The aim of this study was to investigate the prevalence of viral hepatitis B (HBsAg and anti-HBc antibody) in blood groups of blood donors in Al-Najaf governorate (central Iraq). This article is a part of my research in the master's degree. To do this, a total of 16273 blood samples were collected from voluntary donors from (20/5/2016) to (12/12/2016). The presence of HBV was tested by enzyme-linked immunosorbent assay (ELISA) for HBsAg and anti-HBc antibody. The samples were also analyzed in part for age range, gender, profession, liver enzymes and blood characterization. Our results showed that 41 individuals were chronically infected with HBV, one of them was female. Most of the infected patients in the present study, O+ group has the highest frequency among the patients and constituted 16 out of 42 (38.1%) patients, while the AB+ group, the lowest prevalent blood group in patients, and in the present study shows that the group "primary schools" represent the highest percentage and constituted 14 out of 42 (33.33%) patients < 0.05, while the group "high education" constituted the lowest 5 out of 42 (11.9 %) patients.

**Keywords:** Hepatitis B virus, Blood groups, Level of education of patients.

HBV infection is a prominent cause of death worldwide due to its role in the development of cirrhosis, hepatic decompensation, and (HCC). In the United States, it is estimated that more than 1.25 million of inhabitants (0.4% of the population) are chronically infected with HBV<sup>1</sup>. It is estimated that each year, about 4000 patients die because of complications relating this infection and the cost

of hospitalization alone exceeds 1 billion dollars<sup>2</sup>. The chronic hepatitis B is the tenth leading cause of mortality<sup>3</sup>.

Nearly all the public health burden of HBV infection is because of the longstanding influences on the liver functions<sup>1</sup>. The virus transmits vertically from mother to offspring or horizontally by infected blood and bodily

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fluids via contaminated needles or even razors and toothbrushes in addition to sexual and family contacts, but chronic infections acquired throughout the infancy or childhood account for a non-homogenous large share of global morbidity and mortality.

The exhibitions of acute illness include fatigue, jaundice, nausea or abdominal pain which may persist up to six months until elimination of the infection. Those who could not eliminate the infection will develop chronic hepatitis B however. These chronically infected people become carriers for all their life and transmit the virus to other individuals who are not vaccinated<sup>4</sup>.

Vaccination against HBV infection can begin at birth which provides long-term protection against HBV infection in more than 90% of healthy people<sup>5</sup>. Before 1970, approximately 6% of multi-transfused recipients acquired (TTHBV)<sup>6</sup>.

Over the last four decades, the risk of (TTHBV) has been steadily reduced, yet

HBV transmission remains the most frequent transfusion-transmitted viral infection. The remaining risk of HBV transmission is often associated with transfusion of donated bloods negative for HBsAg which are donated in the pre-seroconversion 'period of window' defined as the time between infection and detection of a viral antigen or antibody marker, during the late stages of infection, or bloods with occult hepatitis B infection (OBI) [7]. The presence of HBV DNA without detectable HBsAg outside the window period called (OBI).

The risk of chronic infection is inversely proportional to the age at infection; more than 90% of affected infants will develop chronic infection, while the risk is only 5-10% among adults<sup>8</sup>. Thus, the majority of morbidity and mortality from cirrhosis and liver cancer related to Chronic Hepatitis B (CHB), is concentrated among those who acquire HBV infection at the youngest age<sup>9</sup>.

**Table 1.** ABO blood group test interpretation

Unknown cells with	Unknown serum with	Interpretation	Caucasian Frequency (%)
Anti-A	A cells	Group	40
Anti-B	B cells		
+	0	A	
0	+	B	11
0	+	O	45
+	0	AB	4
0	+		
+	0		
+	0		

**Table 2.** The classification of patients and control groups based on blood groups

Blood Groups	Apparently healthy control N. (%)	Patients N. (%)	Total N. %
O+	4 (20 %)	16 (38.1 %)	20 (32.3 %)
A+	7 (35 %)	14 (33.3 %)	21 (33.9 %)
B+	5 (25 %)	6 (14.3 %)	11 (17.7 %)
AB+	1 (5 %)	4 (9.5 %)	5 (8.1 %)
O-	0 (0 %)	1 (2.4 %)	1 (1.6 %)
A-	2 (10 %)	1 (2.4%)	3 (4.8 %)
B-	1 (5 %)	0 (0%)	1 (1.6 %)
AB-	0 (0 %)	0 (0%)	0 (0 %)
Total	20 (100 %)	42 (100 %)	62 (100 %)

**METHODOLOGY**

**Diagnosis of HBsAg and anti- HBc by ELISA– III**

The detection of HBsAg anti-HBc was done by the use of the third generation of ELISA Figure (1,2), technique using HBsAg and anti-HBc ELISA from BIO KIT (Spanish) and the assay was performed according to manufacturer 2 s instructions.

**Blood Group Determination**

1. A 3-5% suspension of red blood cells was prepared in isotonic saline. (Washed or unwashed cells may be used)
2. One drop of Anti-A and Anti-B was placed respectively, in two small, properly labeled test tubes.
3. One drop of RBC suspension was added to the tube and mixed.
4. The test tubes were centrifuged for 0.5-1 min.
5. Cells were completely re-suspended and examined macroscopically for agglutination.

Note: Hemolysis may be a consequence of bacterial contamination and should not be interpreted as a positive result.



**Fig. 1.** ELISA washer used in current study. (Mehdi's lens)

**Table 3.** The blood group of all samples

Blood Groups	No. of donors	Percent
A+	4318	26.5 %
A-	499	3.07 %
B+	3989	24.5 %
B-	437	2.7 %
AB+	1322	8.12 %
AB-	158	1 %
O+	4893	30.07 %
O-	657	4.04 %
Total	16273	100 %

6. Results were graded and recorded.

Interpretation of test results: + (agglutination) - (no agglutination).

The same procedure was used to determine the Rh group.

**RESULTS**

**Blood Groups**

According to the blood group, both the patients and healthy controls were divided into eight groups: (A+, A-, B+, B-, AB+, AB-, O+, and O-). In the present study, O+ group has the highest frequency among the patients and constituted 16 out of 42 (38.1%) patients, while the AB+ group, the lowest prevalent blood group in patients, constituted 4 out of 42 (9.5 %) patients as shown in chart (1) and Table (2,3).

**Level of education of patients**

According to the level of education, the hepatitis B (HBsAg and anti-HBc) positive patients were divided into four groups: Uneducated, primary schools, secondary schools, and high



**Fig. 2.** ELISA reader used in current study. (Mehdi's lens)

**Table 4.** The classification of HBsAg and anti-HBc positive patients based on the level of education

Level of Education	No. of Patients	Percent %
Uneducated	10	23.8%
Primary Schools	14	33.3% *
Secondary Schools	13	31.0% *
High education	5	11.9%
Total	42	100%

Chi-Square 8.2 Sign Primary schools, Secondary schools  
\*  $P < 0.05$

\*Statistically significant  $P$  value  $< 0.05$ .

education(college). The present study shows that the group “primary schools” represent the highest percentage and constituted 14 out of 42 (33.33%) patient’s  $P < 0.05$ , while the group “high education” the constituted lowest 5 out of 42 (11.9%) patients as seen in chart (2) and Table (4).

**DISCUSSION**

In the current study, prevalence of HBsAg was the highest in blood groups A+ and O+ (33.3% and 38.1%) respectively, where the  $X^2$  calculation

reached to (16.2) which is greater than the value of  $X^2$  (14.07) at a level of significance ( $P < 0.05$ ) Table (2), while in other blood groups it was no significant.while the AB+ group, the lowest prevalent blood group in patients, constituted 4 out of 42 (9.5 %) patients,Because of the small number of donors of these types, because of the scarcity of these blood groups. Our data showed that the prevalence of HBV is higher in A+ and O+ blood groups, and this is true also when the higher proportion of these blood groups in the samples is taken into the consideration. On the other hand,

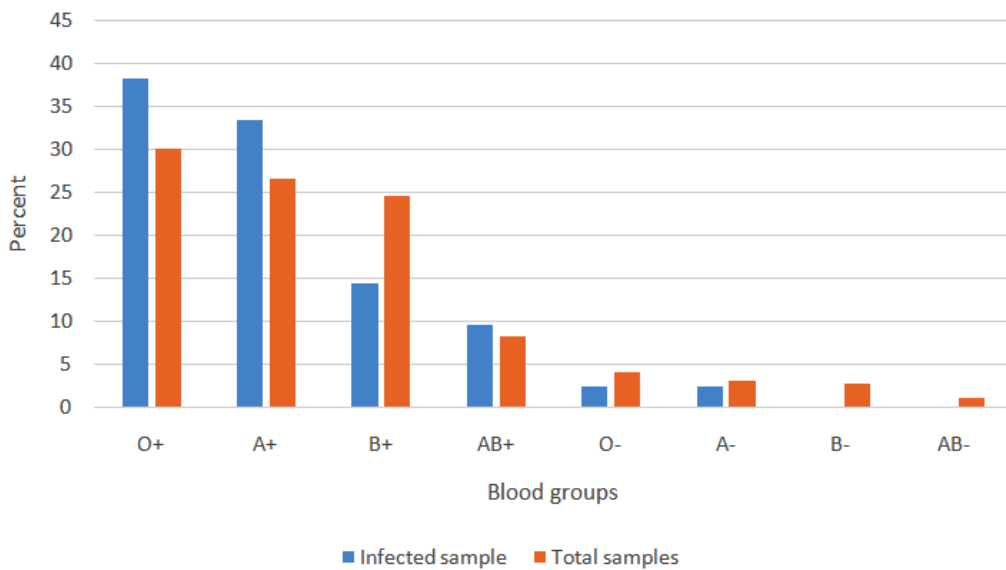


Chart 1. Distribution of samples in different blood groups

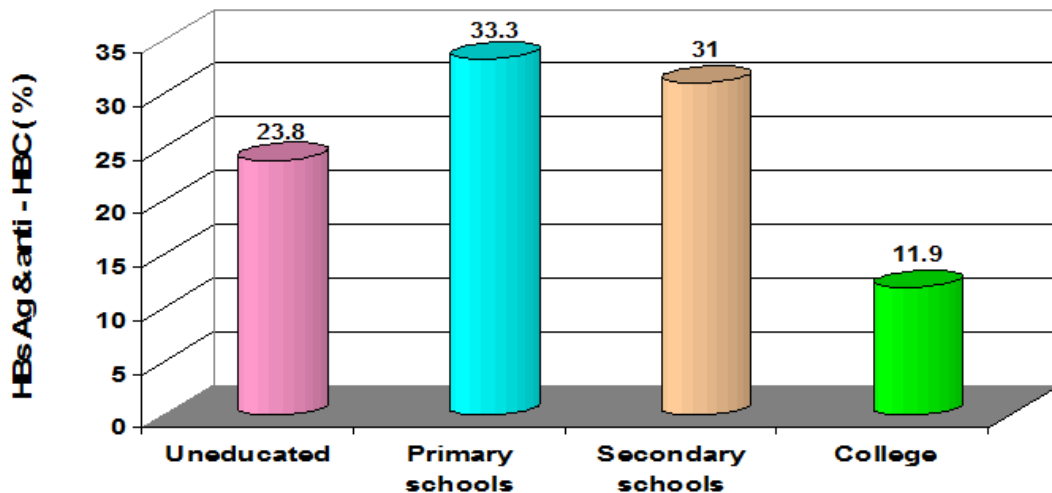


Chart 2. Distribution of HBsAg and anti-HBC positive patients based on level of educated

the prevalence of HBV in B+ and O- blood groups is lower than the rate might be expected from the frequency these two blood groups. The prevalence of chronic HBV infection is higher in men than women and this may be because of the rarity of volunteer female participants in this study. The current study, revealed that there is a significant positive correlation between HBsAg and the level of education (primary schools and secondary schools) 14 (33.3%) and 13 (31%) respectively, where the  $X^2$  calculation reached to (8.2) which is greater than the value of  $X^2$  (7.8) at a level of significance ( $P < 0.05$ ) table (4) and chart (2), while there is no significant correlation between the remaining educational levels and HBV infection.

### CONCLUSIONS

1. The most common blood groups which are infected with hepatitis B is the O+ (38.1%) followed by A+ (33.3%).
2. AB+ group, the lowest prevalent blood group in patients, constituted 4 out of 42 (9.5 %) patients.
3. In the academic achievement, donors from primary and post-secondary studies are at higher risk than those of other levels.
4. High education the constituted lowest risk 5 out of 42 (11.90%) patients.

### REFERENCES

1. Qirbi N., and Hall AJ., Epidemiology of hepatitis B virus infection in the Middle East. *Eastern Mediterranean Health Journal*. 2001; 7: 1034-1045.
2. *The Iraqi Postgraduate Medical Journal*/VOL.11, supplement. (2012).
3. Ramia S., Ramlawi F., Kanaan M., Klayme S., and Naman R. Frequency and significance of antibodies against hepatitis B core (anti-HBc) antigen as the only serological marker for hepatitis B infection in Lebanese blood donors. *Epidemiology and Infection*. 2005; 133: 695-699.
4. Agbesor N., Innocent I.; E.2., Amala Smart; Zaccheaus A. *Jeremiah 3 International Journal of Science and Research (IJSR) ISSN (Online): 2319-7064*. Index Copernicus Value 6.14. Impact Factor (2015): 6: 3917.
5. Geraldine K., Adel A., Intesar A., Jameel N., and Said H. Evidence of Occult Hepatitis B Virus Infection among Omani Blood Donors: A Preliminary Study. *Medical Principles and Practice*. 2006; 15: 368-372.
6. Yassin H., Majid. Hepatitis B Surface Antigen Prevalence Among Screened Populations and Certain Risk Groups in AL-Anbar governorate, *AL-Anbar Medical Journal*. 2016; 13(1): 14-19.
7. Mohammed O. Mohammed. Prevalence of Hepatitis-B and Hepatitis-C among Blood Donors in Sulaimania City. *Journal of Zankoy Sulaimania*, 2006; 9: Part A 115-24.
8. Blakely T1.; Salmond C., and Tobias M. Hepatitis B virus carrier prevalence in New Zealand: population estimates using the (1987) police and customs personnel survey. *New Zealand Medical Journal*. 1998; 111(1064):142-4.
9. Doosti A., Amini- Babil- Olyae S., Tajbakhsh E., Adeli A., Mahboudi F. Prevalence of viral hepatitis and molecular analysis of HBV among voluntary blood donors in west Iran. *New microbiological*. 2009; 32: 193-198.