Seroprevalence of HBsAg among Healthy Blood Donors In Babylon Governorate

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Summary

HBsAg prevalence among healthy blood donors was3% (75:2500). It was increased with age. HBsAg antigenmia was significantly associated with male sex; urban communities; low economic status; low educational level; history of contact with cases of acute hepatitis; but it was not associated with blood group; Rh-type; and a history of blood transfusion.

Introduction:

It is well understood now; that viral hepatitis on a global scale is a major cause of morbidity and mortality in man (Roure, 1995). Hepatitis-B remains an important infection in the community. It was even more serious than many other vaccine preventable infections in terms of number of people affected and the gravity of their long term consequences (Van Damme *et. al*., 1995). The infection with hepatitis-B virus GBV) has serious consequences and it was considered the most common cause of liver cancer (Melnick, 1995).

it has been estimated (Kane, 1995b) that the I{BV has infected more than 2000million person alive today and 350 million person are chronically infected carriers of the virus, at a high risk of death from active hepatitis, cinhosis and primary hepatocellular cancer (Kane, 1995 b). Each year approximately one million people die from the acute and chronic sequel of FIBV infection, making it one of the major causes of morbidity and mortality in man (Kane, 1995 b).

Because the infection with I{BV is largely asymptomatic with mostly long term complications occurring after many years, it did not receive the attention it deserve. There are thus, more measures should be taken against them (Grob, 1995). A key condition for the evaluation of hepatitis-B is the existence of an up to date, reliable data on the epidemiology of HBV infections (Kane, 1995b). The purpose in the present study is to determine the seroprevalence of HBsAg among healthy appreciate the validity of alanine amino transaminase (ALT) level to detect hepatitis-B in the studied group.

Subiects, materials and methods

Subjects: -

Our study extended from the first of January 1996 till the first of January 1997. During this period a total of 2500 healthy blood donors (age range 17
- 44 years; mean age 29-64 years), who had been admitted to the Central Public Health Laboratory Blood Bank, were tested. There were 1622 males and 878 female.

Material

HBsAg in serum samples were detected by ELISA, Hepanostica HBsAg microelisa system, Organon Teknica, Belgium.

Methods

L-Preparation of serum samples:

From each individual, a blood sample of 5-10 ml was taken, left for 15-30 minutes at 37'C till clot and centrifuged at 3000 rpm for 15 minutes. The sera were isolated from the whole blood and then divided into tubes and stored at-2°C till examination .Each tube was used once to avoid repeated freezing and thawing. All sera and reagents were allowed to stand at room temperature before being used in the tests.

2-ELISA

Method for the detection of HBsAg in patient's sera was carried out according to the instruction of the manufacturers that provided with the kits used, which based on "sandwitch" principle.

3- Biochemical test

ALT were estimated by colormetric method of Reitman and Frankle (1957).

4- Statistical analysis

The Chi-square test(X'?) was used when the observations were counts (frequencies).The correlation coefficient (r) was used to determine degree of the relationship between variables (Little and Hill, 1978).

Results and discussion

The results presented from table-l showed that the HBsAg prevalence among healthy donors in Babylon governorate was 3% (75:2500). HBsAg among healthy blood donors in Babylon governorate seemed lower than HBsAg prevalence among general Iraqi population which was found to be 3.3%byhaemagglutination test (Omer, 1975); 4.3% using radioimmunoassay and ELISA (Mohailmed, 1996). This difference could be attributed to the difference in the prevalence of HBsAg among different ethnic groups as all the serum samples tested in

the study were taken from Arabs. This may confirm the results that reported by Omer (1975) who stated that the HBsAg carrier rate of Arabs (2.l %) was.

Lower compared to Kurds (5.5%). This difference in the prevalence of HBsAg carrier rate among different ethnic groups may be related to some sorts of genetic predisposition that differ from one ethnic group to another (Mohammed, 1986). In addition, healthy blood donors have an age range from 17 to 44 years where as the general population includes persons of different age groups. Further more, the above mentioned studies were done in different periods (? l0 years apart) and may reflect the increase in the prevalence of HBsAg among general Iraqi population overtime. HBsAg in Iraq founded to be similar to that of Egypt 4Yo (Darwish *et- a1*., 1993); but lower than the HBsAg prevalence in other Arab countries such as Saudi Arabia7% (Al-Faleh et. a1., 1992); Libya l0.5yo (Saleh et. a1., 1993); and Yemen 18.5% (Guneid et. a1., 1993).

According to the prevalence of HBsAg in different parts of the world, Iraq was considered to be within the area of intermediate endemically, since the prevalence of HBsAg in such areas was found to be 2-7% (tabte-2) (Kane, 1995 b)'According to the sex , HBsAg prevalence among adults exposed to FIBV seemed to be higher in males 3.51% (5711622) than infemales2.05o/o (18:878) as shown in (table-i). This difference was found to be statistically significant (X2:4.07, D.F:l , P:<0.05). These results were in conformity with other studies (Mohammed, 1987; Elavia and Banker,I993; Nuch pryoon and Chumnijarakij, 1993). Forbes and his colleagues (1988) revealed that among adults exposed to HBV, the infection pursue fulminate .course more frequent in females; while conversely a chronic carrier state was more frequent in male. In an attempt to explain this difference, it could be suggested that the hormonal environment for adults might be important in determining the course of HBV infection.

HBsAg prevalence was found to be increased with age. It was lower in the age groupI7-20 (2.1 %(10:477) but higher in older age groups [21-30:3.12% (27:865); 31-40: 3.2l% (30:935); 41-44:3.59% (8:223) l (table-1) (r: 0.8, D.F=1, P<0.05). These results were in conformity with other studies (Bile *et. a1*., I99I; Mahoney *et. al.*, 1995). The higher HBsAg prevalence in older age groups may reflect the effect of multiple exposures to HBV during their life.HBsAg prevalence was 2-92% (19:65l); 3.a% (20:643); 2.88% (17:590); and 3.08% (19:6t6; among donors from blood group type A, B, AB, and O respectively (table-3). HBsAg prevalence was 2.93% (50:1709), and 3.16% (25:791) among donors with positive and negative Rh-type (table-3). These results were in accordance with the results obtained by Omer, (I975)

who indicated that no difference was observed in the prevalence of HBsAg according to the blood group and Rh-type. A higher HBsAg prevalence was found among donors living in urban areas 3.74% (+:1t78) than those living in rural areas 2.35% (31:1322) (table-3). This difference was statistically significant (X^2=4.03, D.F=1,P<0.05). These results were in accordance with the results obtained by Al-Faleh *et. aI.*,(I992), but in contrast with other studies which stated that there was no difference in the prevalence of HBsAg between urban and rural population (Omer,1975).

However, Zuckerman (1987) revealed that FIBV was most prevalent in adults in urban communities than those in rural communities. HBsAg prevalence varied according to the economic state, being high in those with low economic state 4.13% (36:872) and low in those with high economic state 1.75% (9:515) (table-3). This difference was statistically significant (X^2=6.73, D.F=2, p<0.05). Some other results reported by Melnick, (1993), Grob, (1995); and Nuchprayoon and Chumnijarakij, (1993), may confirm these results. In Philippines, 12% of poor people residing in the countryside were HBsAg carriers. In contrast, economically well people had HBsAg positively rate of 2.2% (Domingo *et. a1*., 1993). HBsAg prevalence varied according to the educational level of the donor being high in those with low educational level 4.050 (36:890) and low in those with high educational level 2% (16:80) (table-3). This difference was statistically significant (X^2:5.9, D.F=2,P <0.05)' these results were in conformity with other studies performed in this field (Mohammed, 1986; Gaudeau and Dubois, 1995). This difference in the prevalence of HBsAg among blood donors according to their educational level may reflect the importance of the education on the behavior and the practice of the person (Mohammed, 1986). History related to risk factors that may favor HBV infection was studied (table-4). Parental transmission was the most important route of HBV transmission (Merican, l993). Blood transfusions were established source of HBV. Nonetheless, HBsAg seropositivity was not associated with a history of prior blood transfusions .non of the two healthy blood donors with a history of blood transfusion showed positive reaction for HBsAg .Similarly in other studies very few healthy blood donors give history of brood transfusion and there was no documented relationship between history of blood transfusion and the presence of HBsAg in the blood of these healthy blood donors (Mohammed, 1986; Thaler *et. al*., l99l; Crovari, 1995). A history of surgery was not significantly associated with HBsAg seropositivity, as 1.33 % (1:75) of HBsAg positive donors had history of prior surgery (he had also history of injection with

disposable syringes) compared with 0.41% (10:2425) of HBsAg? healthy blood donors (X^2= 1.4, D.F=l, p >0.05). This was in accordance with other studies which revealed that history of surgery gave no significant risk to the HBsAg Elavia and Banker, 1992; Nuchprayoon und chumnijaraklj, l992; crovari, 1995). This could be explained by good aseptic technique during operative procedures and instrumentation's (Mohammed, 1 986)'

History of dental treatment was higher in HBsAg donors 8% (6:75) than in HBsAg? Donors 4.99% (12l: 2425). However, this, difference was not statistically significant (X^2= 1.3, D.F= l, P>0.05). Elavia and Banker,(1992) revealed that history of dental treatment was not significantly associated with HBsAg seropositivity, where as ' Crovari, (1995). Reported that dental treatment was regarded as a most frequent risk factor. A history of injection was seemed to be associated with HBsAg seropositivity' as 10.67% (8:75) of HBsAg+ donors had history of injection, 4% (3:75) with glass syringes and 6.67% (5:75) with disposable syringes, compared with 4.45% (108:2425)of HBsAg blood donors, l.94%'(47:2425) with glass syringes and 2.52% (61:2425) with disposable syringes, ($X^{2=}$6.05, D.F=l, P <0.01). These results were in contrast with what had been found by Mohammed (1986) who revealed that history of injection gave no significant risk to the HBsAg carrier women. However, our results were in accordance with other studies which revealed that history of injection was regarded a most frequent risk factor (Thaler *et.' al*,l99l; Crovari, l995).This could be attributed to the re-use of disposable syringes and improper sterilization of glass syringes. Levine *et. al*,(1994) revealed that people had as little as 1/50th. Cubic centimeter of serum injected subcutaneously developed jaundice. In addition, outbreak investigations indicated that the incidence of hepatitis was low in clinics were injection equipment being sterilized between patients' HBV readily transmitted through the use of contaminated injection equipments.

Although only few of the HBsAg healthy blood donors gave history ofjaundice2.67% (2:75), but it was significantly higher than in HBsAg? donors 0.45% (11:2455) (X^2=6.86, D.F=1, P<0.0 1)

As precautionary measure persons who have had hepatitis should not become blood donors.

A history of contact with cases of acute hepatitis was significantly associated with HBsAg seropositivity, as 5.33 %(4:75) of HBsAg * donors had history of contact with cases of acute hepatitis compared with 1.8% (44:2425) of HBsAg donors (X^2=4.69, D.F=l, P<0.05). Mohammed,(1986) revealed that 3.7% of HBsAg women gave history of contact with jaundiced patients, whether a husband or other family

member which was significantly higher than in HBsAg? Women (2.5%).Our results were in accordance with the results obtained by Elavia and Banker, (1992) who revealed that there was a significant association between previous history of jaundice and contact with jaundiced patients and the subsequent HBsAg seropositivity.

Higher mean values of ALT was found in HBsAg (32.17 Lu/L) than mean value of ALT (17 .18 IU/L) in HBsAg? blood donors (table-5).ALT occurs in much higher concentration in the liver than elsewhere and consequently increased ALT activity reflects hepatic damage more specifically (Finlayson *et. al*. ,1991).Therefore, the results obtained indicated that HBV infections may induce liver damage.

ALT values in 3Yo (3: 100) of donors who were negative for HBsAg were above the normal level from this finding one may conclude that HBsAg was not necessarily coincident with elevated ALT. However, still HBV or other hepatitis viruses' infections cannot be excluded but further follow up and repeated sampling is required as there is a considerable interval "window" between FIBV exposure and subsequent detection of HBsAg in patients with acute HBV infection (Finlayson *et. al*., l991; Harrey and Alter, 1991) 18.67% (14:75) of HBsAg blood donors had serum ALT value higher 1.2 fold than the upper limit of the normal value (10-40 IU/L), versus 3% (3:100) of the control group (table-5). These results may indicate that an ALT assay was efficient for the detection of HBsAg + sera .It should be noted that the best efficiency was obtained with a low cut-off value (1 .2 or 1.5) the upper limit of the normal value.

Table -1: -Prevalence of HBsAg among healthy blood donors in Babylon Governorate according to the sex and age'

AGE	MALES			FEMALE			TOTAL		
	No. tested	HBsAg		No. tested	HBsAg		No. tested	HBsAg	
		No.	%		No.	%		No.	%
17-20	298	8	2.69	179	2	1.12	477	10	2.1
21-30	539	20	3.7	326	7	2.15	865	27	3.12
31-40	585	22	3.76	350	8	2.29	935	30	3.21
41-44	200	7	3.5	23	1	4.35	223	8	3.59
Total	1622	57	3.51	878	18	2.05	2500	75	3

Table-2:-Worldwide distribution of hepatitis-B infection (Kane, 1995 b). Age Males Females Total

Prevalence and Distribution	Endemicity		
	low	Intermediate	High
Prevalence	<2%	2-7%	8-15%
Chronic infection	<20%	20-60%	>60%
Total infection	Australia	Central Asia	Africa
Distribution	New Zealand	Eastern Europe	Amazon basin
	North America	Japan	Artistic
	South America	Southern Europe	Pacific islands
	Western Europe	Soviet union	China
			Indonesia
			Middle east
			Philippine
			South Europe

Table 3 :- the effect of various factors on the prevalence of HBsAg among Healthy blood donors

Factor	No. tested	HBsAg+	
		No.	%
Blood group			
A	651	19	2.92
B	643	20	3.11
AB	590	17	2.88
O	616	19	3.08
Rh-type			
Rh+	1709	50	2.93
Rh-	791	25	3.16
Resident			
Urban	1178	44	3.74
Rural	1322	31	2.35
Family income			
Low	872	36	4.13
Intermediate	1113	30	2.7
High	515	9	1.75
Educational level			
Low	890	36	4.05
Moderate	810	23	2.84
High	800	16	2

Table-4: - The effect of various factors on the prevalence of HBsAg among healthy blood donors

risk factor	HBsAg		HBsAg-	
	No. total	%	No. total	%
Blood transfusion	0:75	0	2:2425	0.08
Surgery	a-1:75	1:33	10:2425	0.14
Dental treatment	b-6:75	8	121:2425	4.99
Injection	3:75	4	47:2425	1.94
Glass syringes	5:75	6.67	61:2425	2.52
Disposable syringes	8:75	10.67	108:2425	4.45
History of jaundice	2:75	2.67	111:2425	0.45

History of contact with cases of acute hepatitis	4:75	5.33	44:2425	1.81

Table 5:-ALT values HbsAg and control group among healthy blood donors *Normal value = 10- 40 IU/L.

	No. tested	Mean value	N.V. NO. %	>1.2N.V. NO. %	>1.5N.V. NO. %	>2N.V. NO. %
HbsAg	75	32.17	61 81.3	14 18.67	8 10.67	1 1.33
Controls	100	17.2	97 97	3 3	1 1	0 0

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