

# Prevalence of Hepatitis B virus Infection Among Premarital People in Sulaimani Governorate

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## ABSTRACT:

### BACKGROUND:

The magnitude of chronic infection with hepatitis B virus (HBV) varies substantially between the countries. Previous study in Sulaimani revealed that 2.3% of blood donors were positive for HBsAg. A better understanding of incidence and/ or prevalence of HBV infection and associated risk factors provides insight into the transmission of this infection in the community.

Transmission of hepatitis B virus results from exposure to infectious blood or body fluids containing the virus. Possible forms of transmission include unprotected sexual contact, blood transfusions, re-use of contaminated needles, and vertical transmission from mother to child during childbirth.

### OBJECTIVE:

To know the prevalence of HBsAg among premarital people in Sulaimani governorate, and to identify the associated risk factors responsible for seropositivity.

### PATIENTS AND METHODS:

This prospective study was conducted in the premarital consultation clinic in Sulaimani city from November 2008 to February 2009, 1500 premarital people (750 males, 750 females) from age 18 years and above of either sex.

### RESULTS:

The prevalence of HBsAg among premarital people was 0.67%. In multivariate analysis, factors associated with an increased HBsAg risk were occupation, history of surgical operation, blood transfusion and tattooing.

### CONCLUSION:

The prevalence of HBsAg among premarital people in Sulaimani province is lower than that previously reported, with male predominance. A positive relationship between HBsAg with occupation, history of surgical operation, blood transfusion and tattooing was reported.

**KEY WORDS:** hepatitis B, risk factors, elisa, premarital.

## INTRODUCTION:

Hepatitis B viral infection is a disease caused by hepatitis B virus (HBV) which infects the liver of hominoid, including humans, and causes an inflammation called hepatitis. Originally known as "serum hepatitis" <sup>(1)</sup>. The disease has caused epidemics in parts of Asia and Africa, and it is endemic in China <sup>(2)</sup>. About a third of the world's population, more than 2 billion people have been infected with the hepatitis B virus <sup>(3)</sup>. This includes 350 million chronic carriers of the virus <sup>(4)</sup>.

HBV is a double-shelled, enveloped DNA virus belonging to the family Hepadnaviridae (genus Orthohepadnavirus) <sup>(5)</sup>.

The prevalence of HBV carriers varies from 0.1 percent to 2 percent in low prevalence areas (United States and Canada, Western Europe, Australia and New Zealand), to 3 to 5 percent in intermediate prevalence areas (Mediterranean countries, Japan, Central Asia, Middle East, and Latin and South America), to 10 to 20 percent in high prevalence areas (south east Asia, China, sub-Saharan Africa) <sup>(6,7)</sup>.

The wide range in HBV carrier rate in different parts of the world is largely related to differences in the age at infection, which is inversely related to

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the risk of chronicity. The rate of progression from acute to chronic HBV infection is approximately 90 percent for perinatally acquired infection<sup>(8,9)</sup>.

The most common risk factors were sexual exposure (sexual contact with a person known to have hepatitis B, multiple sex partners, and men having sex with men) and injection drug use<sup>(10,11,12)</sup>.

HBV can be transmitted between family members within households, possibly by contact of non intact skin or mucous membrane with secretions or saliva containing HBV<sup>(13)</sup>. However, at least 30% of reported hepatitis B among adults cannot be associated with an identifiable risk factor<sup>(14)</sup>.

The incubation period lasts one to four months. Approximately 70 percent of patients with acute hepatitis B have subclinical or anicteric hepatitis, while 30 percent develops icteric hepatitis<sup>(15)</sup>.

In low or intermediate prevalence areas, approximately 30 to 50 percent of patients with chronic HBV infection have a past history of acute hepatitis; such a history is lacking in the remaining patients in these areas and in the majority of patients in high prevalence areas (predominantly perinatal infection)<sup>(16)</sup>.

Hepatitis B surface antigen (HBsAg) is the serologic hallmark of HBV infection. It can be detected by radio immuno assays (RIA) or enzyme immunoassays (EIA). HBsAg appears in serum 1 to 10 weeks after an acute exposure to HBV, prior to the onset of hepatic symptoms or elevation of serum alanine aminotransferase<sup>(17)</sup>. Persistence of HBsAg for more than six months implies chronic infection<sup>(18)</sup>.

The Aim of the study is to know the prevalence of HBsAg among people who undergo premarital screening investigations in premarital consultation clinic in Sulaimani city, and to identify the

associated risk factors responsible for seropositivity.

### **PATIENTS AND METHODS:**

This is across sectional study conducted in premarital consultation clinic in Sulaimani from November 2008 to February 2009. All couples who visited this clinic during this period which comprise one thousands five hundred apparently healthy subjects (750 males and 750 females) were evaluated.

All subjects were interviewed; history had been taken from each case by using special questionnaire form, including demographic data (name, age, and gender), occupation, history of dental procedure, surgical operation, endoscopy, blood transfusion, jaundice, tattooing, parenteral drug using and history of trauma.

From each subject, 5 ml of blood was drawn, the sample was sent for premarital screening test which include blood grouping, complete blood count, HIV test and HBsAg test. Identification of HBsAg was done by using ELISA technique.

Statistical package for social science (SPSS) program version 15 was used for statistical analysis, the frequency distributions were obtained, after the grouping of data to different variables, and statistical significances of these ratios were analyzed by chi-square test to

identify the effect of some factors (Odd ratio and confidence interval), probability ( p )value equal or less than 0.05 was considered to be statistically significant.

### **RESULTS:**

In this study, 1500 healthy premarital persons were evaluated, 750 (50%) male and 750 (50%) females. Their ages ranged from 18 to 65 years and the mean of age was 25.84 years.

The prevalence of HBsAg positivity among the premarital people was (0.67%), positive HBsAg was found only in 10 subjects. Figure-1

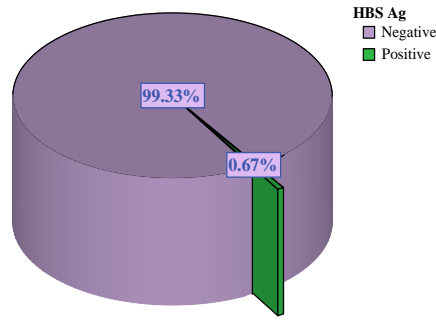


Figure 1: The prevalence of positive HBsAg among premarital people.

Table 1: Frequency and percentage of subjects according to the risk factors.

Variables	Option	Frequency	Percentage
History of dental procedure	No	687	45.8
	Yes	813	54.2
History of surgical operation	No	1146	76.4
	Yes	354	23.6
History of endoscopy	No	1443	96.2
	Yes	57	3.8
History of blood transfusion	No	1463	97.5
	Yes	37	2.5
History of jaundice	No	1433	95.5
	Yes	66	4.4
History of tattooing	No	1312	87.5
	Yes	188	12.5
History of parentral drug using	No	1496	99.7
	Yes	4	0.3
History of trauma	No	1392	92.8
	Yes	108	7.2

Approximately 813 (54.2%) had positive history of dental procedure while 687 (45.8%) had no history of dental procedure. Regarding the history of surgical operation, 354(23.6%) had positive history while 1146 (76.4%) had negative history Table-1. According to the occupation of the subjects, 33.13% were housewives, 31.8% of the subjects were free works, 18.87% were officers, 9.27% were students, and 6.93% were policemen. Mean age among HBsAg positive people was 26.1years while of HBsAg negative was 25.8years with no statistically significant difference. The relationship of positive HBsAg with gender shows relative significance (P= 0.056) with (Odd ratio of 4.1) among male than females.

Regarding the occupation, there was a significant relation between the HBsAg and subjects who work as police (p value=0.016), as 104 of the subjects work as police, 3 (2.9%) of them had positive HBsAg. The relation of positive HBsAg with history of dental procedure was not significant (p value=0.484). The relation between positive HBsAg and history of surgical operation was significant (p value=0.015), as 354 of the subjects had history of surgical operation, 6 (1.7%) of them had positive HBsAg. There was no significant relation between HBsAg and history of endoscopy (p value=0.678). Also a significant relation is found with history of blood transfusion

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(p value=0.024), as 37 of the subjects had history of receiving blood, 2 (5.4%) of them had positive HBsAg. No significant relation was found between HBsAg and history of jaundice (p value=0.637). A significant relation was found between positive HBsAg and history of tattooing (p value=0.004), as

188 of the subjects had history of tattooing, 5 (2.7%) of them had positive HBsAg. No significant relation was found between positive HBsAg and parental drug using or history of trauma Table-2.

**Table 2 :The association of positive HBsAg with risk factors.**

Variables	HBS Ag		Odd Ratio (confidence interval )	P value
	Negative N (%)	Positive N (%)		
Gender				
Female	748(99.7)	2(0.3)	4.1 (0.92-25.6)	0.056
Male	742(98.9)	8(1.1)		
Occupation				
Officer	283 (100.0)	0(0.0)	No OR ( more than 2 variable)	0.016
Free works	472 (99.0)	5(1.0)		
Student	139 (100.0)	0 (0.0)		
House wife	495 (99.6)	2(0.4)		
Police	101 (97.1)	3(2.9)		
History of dental procedure				
No	683 (99.4)	4(0.6)	1.2 (0.317-5,37)	0.484
Yes	807 (99.3)	6(0.7)		
History of surgical operation				
No	1142 (99.7)	4(0.3)	4.9 (1.22-20.8)	0.015
Yes	348 (98.3)	6(1.7)		
History of endoscopy				
No	1433 (99.3)	10(0.7)	2.5 (0.118-19.55)	0.678
Yes	57 (100.0)	0(0.0)		
History of blood transfusion				
No	1455 (99.5)	8(0.5)	10 (1.43-54.6)	0.024
Yes	35 (94.6)	2(5.4)		
History of jaundice				
No	1424 (99.3)	10(0.7)	2.1(0.102-16.7)	0.637
Yes	66 (100.0)	0(0.0)		
History of tattooing				
No	1307 (99.6)	5(0.4)	7.1 (1.77-28.6)	0.004
Yes	183 (97.3)	5(2.7)		
History of parentral drug using				
No	1486 (99.3)	10(0.7)	3.7 (1.44-42.7)	0.947
Yes	4 (100.0)	0(0.0)		
History of trauma				
No	1384 (99.4)	8(0.6)	3.2 (0.46-16.5)	0.157
Yes	106 (98.1)	2(1.9)		

### DISCUSSION:

Hepatitis B virus (HBV) is the most common cause of serious liver infection in the world. About a third of the world's population, more than 2 billion people have been infected with the hepatitis B virus. This includes 350 million chronic carriers of the virus<sup>(3,4)</sup>. We screened 1500 healthy premarital subjects, 750

males and 750 females; their ages range from 18-65 years with mean of 25.84 years, because of our oriental, Islamic society encourages relatively early marriage.

Hepatitis B surface Ag was positive in 10( 0.67%) of the individuals entered the study; this result was lower than that of Mohammed O. *et al*, a study

conducted in Sulaimani, Kurdistan Region-Iraq in 2006, which showed that the prevalence of HBsAg positivity among 1514 blood donors was 2.3%<sup>(19)</sup>, this may be due to the improvement in the people's education and knowledge about the hepatitis B viral infection, effective blood screening, and increasing the vaccination program applied against HBV infection. This result was similar to that of Blakely T. *et al*, a study which estimates the hepatitis B surface antigen (HBsAg) carrier prevalence for adults in New Zealand, and showed that the prevalence of HBsAg was 0.5%<sup>(20)</sup>. However our result was lower than that of Sebastiao Viana *et al*, a study which was done in the western Brazilian Amazon, and showed that of 2656 samples, 3.3% were positive for HBsAg<sup>(21)</sup>. In the present study there was no significant relation of HBsAg positivity with the age  $p$  value= (0.889), but gender shows relative significance  $P$  value (0.056) with Odd ratio of 4.1, a result which is similar to that of Blakely T. *et al* study<sup>(22)</sup>.

One hundred and four of the subjects were working as police; among them three (2.9%) were HBsAg positive ( $p$  value=0.016), this result is higher than that of Bandara nayake DR.*et al*, a study done in New Zealand in 1987, which showed that the prevalence ratio of HBsAg for police officers was 0.82%. this may be explained by the fact that of increase the rate of accidents and exposure among this group with subsequent risk of viral transmission<sup>(23)</sup>. However this figure is slightly lower than that of Sonder GJ *et al*, a study done in the Amsterdam police force, 2000-2003, were 112 exposures with viral transmission risk were reported and finding 4% HBsAg positive<sup>(24)</sup>.

Only 6 (0.7%) subjects out of 813 who had history of dental procedure were HBsAg positive which is statistically not significant ( $p$  value=0.484, OR=1.2), this result is much lower than that of Odaibo GN. *et al* a study done in Nigeria, and shows that the overall HBsAg infection rate was 18.3%<sup>(25)</sup>. The low results in the present study may be due to using a sterile or disposable instrument during dental procedures, also may suggests that Dental Surgeons in this environment have been immunized at the beginning of their professional life with its effect in decreasing the rate of viral transmission form the dentist to their patients and vice versa.

The relation of HBsAg positivity with history of surgical operation was significant ( $p$  value=0.015, OR= 4.9), as 354 subjects had history of major

surgery, among them, 6 (1.7%) were positive for HBsAg. This result is similar to that Mohammed O. *et al*, which showed that 177 blood donors who had been underwent surgical operation, among them 3 (1.7%) were HBsAg positive. this mean that surgery with contaminated instruments is another essential way of transmitting HBV infection especially in the emergency department, where sometimes non-screened blood had been given and non sterilized instruments might have been used<sup>(19)</sup>.

No significant relation was found between HBsAg and past history of endoscopy, as 57 subjects underwent endoscopy, among them no one showed positive HBsAg. This result is similar to that of Anna S. F. Lok *et al*, a study was done in Hong Kong, and showed that one hundred and eleven patients with no HBV markers underwent endoscopy; none of them showed seroconversion to HBsAg<sup>(24)</sup>. It was demonstrated that with a standard cleaning procedure (With Glutaraldehyde) there was no evidence of endoscopic transmission of HBV infection even in an endemic area<sup>(26)</sup>.

Thirty- seven subjects had the history of blood transfusion; among them two were HBsAg positive, ( $p$  value=0.024, OR=10) which is considered a significant result. This result is higher than that of Mohammed O. *et al*, which showed that among 25 donors who had history of blood transfusion, no one had positive HBsAg<sup>(27)</sup>. This may be explained by the fact that all donations issued for transfusion have been tested for hepatitis B surface antigen as a marker of transmissible hepatitis B virus. These measures have resulted in low rates of transmission by transfusion but have not eliminated all infectious donations from the blood supply. A donation is concluded as having been probably infectious if the donor was HBsAg negative but had evidence of acute infection or of carrying the virus (antibody to hepatitis B core antigen with no or low titers of antibody to surface antigen)<sup>(26)</sup>. Mutant strains of hepatitis B virus not detected by routine surface antigen tests also pose a risk of infectious donations being transfused<sup>(28)</sup>.

Another point which may be associated with increasing the risk of the transmission is the usage of non-screened blood for transfusion which might sometimes occurs during emergency surgical operations.

No significant association was found between HBsAg and previous history of jaundice ( $P$ =0.637), among 66 subjects who mentioned to

have history of jaundice, no body showed positive HBsAg.

Among 188 subjects who had tattooing, 5 (2.7%) of them were positive for HBsAg, which is statistically significant ( $p=0.004$ , OR =7.1), higher prevalence was seen in Shi MD. *et al*, a study which was done in Taiwan and showed among 476 young adult male, 11.3% of them were positive for HBsAg, this confirm the strong association between tattooing and the risk of transmission of the virus<sup>(29)</sup>.

In the developing countries the administration of unnecessary injections, because they think that this is the most effective mode of treatment, is mainly responsible for the transmission of blood pathogens, which also includes hepatitis B virus<sup>(29)</sup>.

Though in this study there is no significant association with HBsAg, as among 4 subjects who had history of parenteral drug using; no one of them had positive HBsAg ( $p=0.947$ ). A study by Farid Ullah Shah.*et al*, which was done in Islamabad, and found that among 15 patients with chronic hepatitis B, 14.8% of them there was a history of repeated injection from the general practitioners, but with no body showed independent risk. This can be explained on the base of using disposable needles which is widely available<sup>(30)</sup>.

Among 108 subjects who were exposed to trauma, only 2 (1.9%) were positive for HBsAg, however it is not statistically significant ( $p=0.157$ ) but has significant OR=3.2, which signify increased risk of infection. This result is supported by Villani C. *et al*, a study was done in Italia, and showed that the prevalence of HBV infection to be higher in the trauma patients (6.6%) who required orthopedic surgery than in the elective orthopedic patients (3.3%)<sup>(31)</sup>.

#### CONCLUSION:

Premarital screening program is of paramount important project in detecting asymptomatic carriers of hepatitis B viral infection and in controlling the vertical transmission through identifying HBsAg positive subjects before they get married and then applying a protective vaccination schedule against HBV for the unaffected partner.

The prevalence of HBsAg among premarital people in Sulaimani city is lower than that previously reported with male predominance. A positive relationship between HBsAg and occupation, surgical operation, blood transfusion and tattooing was reported.

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