

Seroprevalence and risk factors of hepatitis B virus surface antigen among the workers in a garment factory

Mohammad Mizanur Rahman, Nasima Khatun, Ahsan Habib, Md. Rafiqul Islam and Farhana Islam

Article Info

Department of Hematology, Armed Forces Institute of Pathology, Dhaka Cantonment, Dhaka, Bangladesh (MMR); GILDAN, Polashbari, Ashulia, Savar, Dhaka, Bangladesh (NK); Department of Anatomy, Armed Forces Medical College, Dhaka Cantonment, Dhaka, Bangladesh (AH); Army Medical Corps Centre and School, Shaheed Salahuddin Cantonment, Ghatail, Tangail, Bangladesh (MRI); BGMEA Medical Centre, Mirpur, Dhaka, Bangladesh (FI)

For Correspondence:

Mohammad Mizanur Rahman
mizan142004@yahoo.com

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The purpose of this study is to find out the prevalence of seropositivity and risk factors associated with hepatitis B virus infection. A total of 2,737 readymade garment workers were initially screened after getting departmental as well as the individuals consent and simultaneously a questionnaire was filled up by the field research assistants to assess the risk factors. Initially 59 cases were found positive for hepatitis B virus surface antigen (HBsAg) by immunochromatographic test. Enzyme linked immunosorbant technique was then applied to the screened positive HBsAg individuals and four cases turned out as negative and therefore a total of 55 HBsAg positive cases were detected in this factory. Statistically significant risk factors associated with HBsAg positivity were jaundice, history of previous surgery and accident, needle stick injuries and unsafe injections. This study concludes that the seropositivity found garment workers is similar to the general population of Bangladesh.

Introduction

The textile and garment manufacturing sector of Bangladesh is fuelled by adult, grown-up cityfying workers many of whom are female. The majority of productions are destined for U.S. and European market and ready-made garment industry of Bangladesh now accounts for approximately 78% of total exports.¹ Bangladesh government adopted national regulations and international conventions to address the problems of readymade garments workers related to health and lives.

In spite of embracing such policies the workers of the garment factories are still vulnerable to different occupational health hazards such as physical and mental hazards as well as environmental hazards. Among the physical hazards, exposures to toxic agents, uneasy, stiff postures and reiterative motion are more frequently encountered.²

Hepatitis B virus (HBV) is a double stranded DNA virus responsible for hepatitis B or serum hepatitis.³ In addition, chronic carriers of HBV may develop cirrhosis and hepatocellular carcinoma. There is increased risk of development of pancreatic cancer.^{3,4} The mode of transmission of HBV is through blood, semen, or any other body fluids from a person infected with the hepatitis B virus entering into the body of any individual who was not exposed or infected with HBV previously. Sexual contact, sharing

needles, syringes, or other drug-injection equipment; or transplacental passage are the main means of HBV transmission. HBV infection may be acute/short-term or chronic/long-term illness and infected infants (about 90%) are more susceptible to develop chronic infection in comparison to adults where the incidence of chronicity is 2-6%.

In developing countries like Bangladesh, the socio-economical factors and poorly developed health care system are the primary barriers for fruitful control of HBV. The frequency of HBV infection is diverse in different countries and also differs within countries due to distinctive host factors such as life style and environs.⁵ Globally more than 300 million people are in a state of chronic HBV infection and in many countries of Africa and Asia, the prevalence is more than eight percent with two billions have the evidences of acute or previous infection and 350 millions have the markers of chronic HBV infection.⁶ Analysis of different studies carried out in Bangladesh on the prevalence of HBV infection revealed that hepatitis B virus is the leading causal factor for acute hepatitis, chronic hepatitis, cirrhosis of liver and hepatocellular carcinoma and Bangladesh falls in the intermediate group in terms of HBV frequency throughout the world.^{7,8}

As previously, there is only one study with a small sample size about hepatitis B virus infection among the workers in selected garments,⁹



we have decided to find out the prevalence and risk factors of hepatitis B virus infection among the workers in a large multinational garment factory.

Materials and Methods

This retrospective study was carried out in a multinational garment factory, Savar, Dhaka, Bangladesh in the month of May 2017 as a part of routine health checkup and as one event to celebrate the environmental health safety week of the factory. The factory physician explained the purpose and objective of the test for HBV infection to the administrators at various levels of the industry. After getting permission from the concerned authority, laboratory technologists and trained field research assistants from the diagnostic division of a renowned pharmaceutical company were appointed in nine groups comprising two in each for explaining the aims, reasons and advantages of such screening tests as well as collecting blood samples from each worker for further processing. Three laboratory technologists and three trained field research assistants, a total of six, were held responsible for taking motivation class, filling the questionnaire containing socio-demographic characteristics to find out any risk factors associated with any participants and blood collection from the workers who were divided into three groups for three phlebotomy booths for each floor. After motivation class, workers were free to fill up the questionnaire and to participate in the screening tests for HBV. Taking all aseptic precautions, 4 mL of blood was collected from each participant

by the phlebotomists (the laboratory technologists), preferably from the antecubital veins. The collected blood specimens were, then, sent to the diagnostic division of the pharmaceutical company within 6 hours where the centrifugation of collected blood was done and stored at -20°C in aliquots. The blood collection program was continued for three days and a total of 2737 blood samples were collected during this period from the individuals serving in the factory. For the diagnosis of hepatitis B virus surface antigen (HBsAg), immunochromatographic technique was used. Later on, those who were found positive by immunochromatographic technique were again re-checked using the commercially available enzyme-linked immunosorbent assay kits. After receiving the results of both tests for HBsAg, all the test results and data for the risk factors were analyzed by the Microsoft Excel and SPSS 25. Chi-square (χ^2) test and p value were calculated. P value of <0.05 was considered significant. A schematic representation of the study profile is shown in Figure 1.

Confidentiality of the laboratory results was strictly adhered and the plant doctor shared the results with the HBV positive individuals. Affected workers were given necessary advice on the prevention of spread of HBsAg to non-infected individuals and requested them to consult with the hepatologist in any hospital or medical installation.

Results

A total of 2,737 workers were included in this study in the month of May 2017. Most of the individuals were young adults with a mean (\pm 1SD) age of 31 ± 6.0 years (99% Confidence interval (CI): 30.7 to 31.3 years). Female workers were 1,505 and male 1,232.

Out of 2,737 workers, only 59 (2.2%) workers were found HBsAg positive by immunochromatographic method. Males were 36 and female 23. Male workers were significantly more affected (Chi-square = 6.2 and $p=0.012$) than the female workers. The mean age of the positive cases was 31 ± 5.0 years and 99%CI was 29.3 to 32.7 years. Demographic data of the total participants and seropositive cases are shown in Table I.

These 59 cases were again tested by enzyme-linked immunosorbent assay for confirming the presence of HBsAg. Five cases turned out as negative by the test.

To find out the possible causes or association with the positivity of HBsAg, each participant was inquired about ten variables such as blood

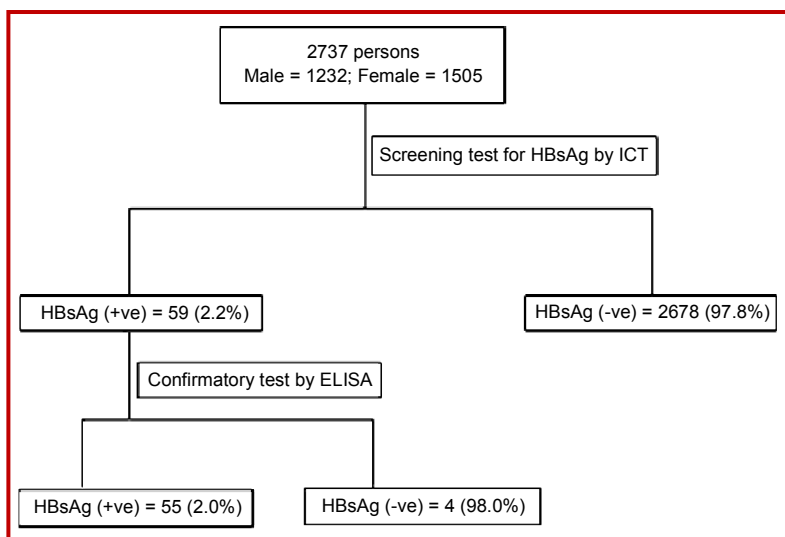


Figure 1: Study profile

Table I

Demographic data of the participants (n = 2,737)			
		Seropositive by	
		Immunochromatographic technique	Enzyme-linked immunosorbant assay
<i>Sex</i>			
Male	1,232	36	32
Female	1,505	23	23
<i>Marital status</i>			
Married	2,700	59	55
Unmarried	37	00	00

transfusion, history of jaundice, any surgical procedure performed in the past, history of accident, needle stick injury, visiting community barber, received injection by unsafe means, history of circumcision in case of male, ear-nose piercing in females only and history of tooth extraction. These risk factors with chi square test and p value are shown in Table II.

Discussion

Because of high cost, prevalence studies are not always easily undertaken in developing countries like Bangladesh. In this multinational garment industry, every year environmental health safety week was celebrated and the administration with the advice of factory doctor, they used to appoint one specialist physician from any disciple of medicine who attends the interested workers over the entire week as well as select one laboratory investigation for checkup. In 2017, test for HBsAg was selected as health checkup item. This study quantitatively assessed the burden of HBsAg among the garment workers which also reflect the national burden of HBsAg.

In this study, the participants were predominantly female (55.0%) and most of the individuals were in the age group between 20–30 years. In our study, the prevalence of HBsAg was 2.0% which correlates with the study of Zaki et al carried out in 2003 among healthy adults and children.¹⁰ The prevalence of HBsAg in this study belongs to the intermediate risk groups where HBsAg positivity

Table II

Risk factors associated with HBsAg positive cases (n = 55)

Risk factors	Status of factor	HBsAg positive f (%)	HBsAg negative f (%)	χ^2	p value
Blood transfusion	Received (n = 13)	1	12	2.1	0.145 ^{NS}
	Not received (n = 2,724)	54	2670	2.1	0.145 ^{NS}
Jaundice	Positive history (n = 29)	5	24	34.7	0.000 ^S
	Negative history (n = 2,708)	50	2658	34.7	0.000 ^S
Previous surgery	Positive history (n = 06)	1	5	6.6	0.010 ^S
	Negative history (n = 2,731)	54	2677	6.6	0.010 ^S
Accident	Positive history (n = 38)	3	35	6.8	0.009 ^S
	Negative history (n = 2,699)	52	2647	6.8	0.009 ^S
Circumcision in males only	Done (n = 1,176)	54	1122	0.1	0.806 ^{NS}
	Not done (n = 28)	1	27	0.1	0.806 ^{NS}
Needle stick injury	Received (n = 54)	8	46	45.6	0.000 ^S
	Not received (n = 2,683)	47	2636	45.6	0.000 ^S
Visiting community barber	Visited (n = 867)	24	843	0.3	0.56 ^{NS}
	Not visited (n = 365)	8	357	0.3	0.56 ^{NS}
Unsafe injection	Received (n = 32)	4	28	18.2	0.000 ^S
	Not received (n = 2,705)	51	2654	18.2	0.000 ^S
Ear-nose piercing in female only	Yes (n = 1,505)	23	1482		
Tooth extraction	Yes (n = 2,737)	55	2682		

χ^2 = Chi-square; NS= Not significant; S= Significant

ranges from 2-7%.¹¹ In another study among the population living in Kamalapur, Dhaka, Bangladesh showed a high prevalence of HBsAg (6.5%).¹² This difference is due to the diversities in study population and study area. The present study conducted in a garment factory where the workers are enjoying a reasonable standard of living and also getting medical as well as other socioeconomic facilities in an acceptable manner. But the study of Ashraf et al was carried out in a densely populated community where socio-economic standard is relatively poor.¹²

In Bangladesh, the prevalence of HBsAg positivity observed in general populations is 3.0%¹³ which is slightly higher than the findings in the present study. The finding of low incidence of HBsAg in the present study may be due to the effect of expanded program on immunization against six infectious diseases introduced by the government of Bangladesh and UNICEF in 2004. If such program runs on effectively, the incidence of chronic HBV infection is expected to reduce in the next generations.¹²

Among the risk factors in this study, past history of jaundice (17.2%) followed by past history of surgery (16.7%), needle stick injuries (14.8%), unsafe injection (12.5%), past history of accident (7.9%) and blood transfusion (7.7%) were mainly associated. In a study, the prevalence of HBsAg was 6.2 and 4.4% among injectable and non-injectable drug abusers respectively.¹⁴ The higher rates among workers exposed to unsafe injection in this study could be attributed to the lack of appropriate health knowledge because of less public health awareness about the transmission of HBV infection and due to frequent visit to the indigenous bare footed doctors as well as taking injection as the remedial treatment due to their any type of illness as well as the relatively less availability and slightly high cost of hepatitis B vaccine in the country.

Conclusion

The present study indicates the prevalence of HBV infection among the workers in a garment factory but the risk factors associated with such positivity in this study are not related to the working pattern of the garment factory and this incidence correlates with the overall incidence of general population of Bangladesh.

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