

Original Research Article

Hepatitis B virus infection among chronic renal failure predialysis patients in Hodiedah, Yemen: Retrospective study

Abstract

Background: Hepatitis viruses cause problems at almost all the stages of chronic renal failure (CRF). Most of hepatitis B virus (HBV) infected patients live in developing countries with infections rate varying from country to country.

Objective: This study aimed to determine the prevalence of HBV in renal failure pre-dialysis patients in renal dialysis center of Hodiedah city, Yemen.

Methods: Demographic data of 278 patients collected retrospectively for a period of 4 years and eight months from January 2011 to September 2015. All patients examined for hepatitis B surface antigen using one-step cassette device. The demographic data of patients recorded namely sex, age, education, residence and occupation.

Result: Out of 278 patients, 10 cases (3.60%) found to be having HBV infection. Out of 10 positive patients, 7 cases (4.14 %) were males and 3 cases (2.75 %) were female. The highest prevalence found in the 41- 60 age group (4.39 %) followed by 21-40 age group (3.85%). HBV detected in the 6 (4.72%) of 127 urban residence patients and in 4 (2.65%) of 151 rural residence patients. The prevalence of HBV showed similar among educated and non-educated subjects (5 cases for each). There was a predominant non-occupant distribution (10/252=3.97%) as compared to occupant (0/26=0.00%). The prevalence of HBV differed none significantly by the age, accommodation, education and significantly by sex and occupation.

Conclusion: The prevalence of HBV infection is low in chronic renal failure pre- dialysis patients.

Keywords: HBV, Renal, Chronic , Failure , Yemen

1. Introduction

Chronic renal failure (CRF) is a progressive, irreversible deterioration in renal function. In CRF patients, retention of urea and other nitrogenous wastes in the blood (uraemia or azotaemia) occur due to fails in the body's ability to maintain metabolic, fluid

and electrolyte balance¹. CRF may be caused by systemic diseases, such as diabetes mellitus (leading cause), hypertension, pyelonephritis, chronic glomerulonephritis, obstruction of the urinary tract, polycystic kidney disease and vascular disorders. Infections, medications and toxic agents may also cause CRF². Prevalence of CRF is rising worldwide and the global patient population continues to grow at an alarming rate^{3, 4}. In 2012, 2.1 million patients worldwide were required haemodialysis and this number is expected to increase by 7% annually⁵.

Chronic haemodialysis patients are at increased risk for transmission of HBV infections. In dialysis environment, the HBV transmission is associated with contaminated blood and blood product transfusion, exposure to contaminated haemodialysis equipment during treatment⁶⁻⁹, lower immunity and lower response rate to hepatitis B vaccine of dialysis patients that makes them much more vulnerable to acquire HBV¹⁰. This infection is very serious public health problem with an estimated 2 billion individuals infected worldwide and 350 million with chronic HBV infection. The World Health Organization estimates that 500,000 to 1.2 million deaths each year are due to HBV-related chronic liver disease^{11, 12}.

The HBV is a small double stranded circular DNA virus of about 3.2 kilo base (kb) pairs belongs to the family Hepadnaviridae with exceptional similar features to retroviruses¹³. HBV is divided based on more than 8% genetic diversity into 10 different genotypes A to J. If genomic diversity is between 4% and 8%, these genotypes are further divided into sub genotypes. HBV genotypes and sub genotypes have specific geographical distribution patterns¹⁴. The infectious HBV virion (Dane particle) has a spherical, double shelled structure 42 nm in diameter, consisting of a lipid envelope containing HBsAg that surrounds an inner nucleocapsid composed of hepatitis B core antigen (HBcAg) complexes with virally encoded polymerase and the viral DNA genome¹³.

Developing countries have a high prevalence of HBV infections^{15, 16}. This high prevalence explained by non-knowledge about the universal infection control procedures¹⁷. In Yemen, previous studies demonstrated that the prevalence of HBV chronic infection in different Yemeni cities ranges from 1.8% to 34%¹⁸⁻²¹.

There is insufficient data on the prevalence of HBV infections in the chronic renal failure population without renal replacement therapy or during predialysis period²²⁻²⁴. Therefore, the aim of the present study was to determine hepatitis B surface antigen

seroprevalence in chronic renal failure pre- dialysis patients in renal dialysis center of Hodiedah city, Yemen.

2. Methods

2.1 Study area and design

Our study is a retrospective record- based study carried out in renal dialysis center in Hodiedah city in western of Yemen. The demographic data of 278 renal failure patients admitted to the dialysis center for hemodialysis for the first time collected for a period of 4 years and eight months from January 2011 to September 2015.

2.2 Study population

Demographic data collected from renal failure predialysis patients aged between 8 and 80 years. The studied population stratified into male, female and four age groups. Study population further divided into two residence groups: urban and rural. According to stage of education, population stratified into two groups: educated and no educated. In addition, population divided to occupant and non-occupant group according to occupation.

2.3 Sample Analysis

All patients screened for hepatitis B surface antigen by using one-step cassette style device as per instructions from the manufacturer (Rapid HBsAg Test, Intec, China).

2.4 Data Analysis

Demographic and laboratory results data entered and analyzed using Excel Software 2010. Descriptive analysis and Chi-square test used to make comparisons among categorical variables. For all statistical analyses, a *p* value of less than 0.05 considered statistically significant.

3. Results

The general characteristics of patients and the obtained result are summarizing in Table 1. Out of the total 278 patients, 10 cases (3.60%) found to be having HBV infection. Out of the 10 HBV positive patients, 7 cases (4.14%) of males and 3 cases (2.75%) of females. 5 cases of 132 patients (3.85 %) and 5 cases of 114 patient (4.39) found in the 21- 40 and 41 - 60 age group respectively. No prevalence observed in the age group of < 20 years and > 60 years. HBV detected in the 6 case of 127 (4.72 %) patients who reported urban residence and in 4 cases of 151 (2.65 %) patients who reported rural residence. The prevalence of HBV infection showed in 5 cases (3.85 %) of 130 non-educated subjects and in 5 cases (3.38%) of 148 educated subjects. There was a predominant non-occupant distribution (10/252=3.97%) as compared to occupant (0/26=0.00%). The prevalence of HBV

differed none significantly by the age, accommodation, education and significantly by sex and occupation.

Table 1 : Ratio of HBV infection and characteristic of patients, Hodeidah, Yemen

Variable	Number	Ratio	HBV (+)		<i>p</i> value
			No.	%	
Sex					
Male	169	60.80	7	4.14	<i>p</i> < 0.05
Female	109	39.20	3	2.75	
Total	278	100	10	3.60	
Age					
< 20 years	13	04.70	0	0	<i>p</i> > 0.05
21 - 40	130	46.80	5	3.85	
41 - 60	114	41.00	5	4.39	
> 60 years	21	07.60	0	0	
Total	278	100	10	3.60	
Accommodation					
Rural	151	54.32	4	2.65	<i>p</i> > 0.05
Urban	127	45.70	6	4.72	
Total	278	100	10	3.60	
Education					
Educated	148	53.24	5	3.38	<i>p</i> > 0.05
Non Educated	130	46.80	5	3.85	
Total	278	100	10	3.60	
Occupation					
Occupant	26	09.35	0	0	<i>p</i> < 0.05
Non Occupant	252	91.64	10	3.97	
Total	278	100	10	3.60	

4. Discussion

Hepatitis viruses cause problems at almost all the stages of CRF. 95% of HBV infected patients live in developing countries with infection rates varying from country to country ²⁵. It is believed that hepatitis viruses are frequently found in patients especially in stages 3 to 5 of chronic renal disease because of various reasons such as transfusions, frequent contact with infected patients and health staff, dialysis with an infected machine, and increased touching of contaminated material ²⁶.

In the present study, the prevalence of HBV was 3.60% in studied population. This low prevalence may be due to all renal failure patient included in this study do not receiving dialysis before our testing. In our country no study on predialytic CRF patients found, thus we think that recent study is unique in this area. Worldwide, few studies exist about the prevalence of hepatitis viruses among CRF patients who are in the predialysis stage ^{27, 28}. These studies mostly carried out in the regions with a high prevalence of hepatitis ^{25, 29}. Sit and *et al.* (2007) ³⁰ reported that the prevalence of HBV in Patients with CRF in the predialysis Stage at a University Hospital in Turkey was HBsAg 10.5%, anti-HBc 36.8%, anti- HBs 28.7%, HBeAg 5.3%, anti-HBe 32.7%. Pişkinpaşa and his colleagues showed (2001) ³¹ the prevalence of HBV in Patients diagnosed as having CRF without renal replacement therapy (predialysis) was 3.5%. López-Alcorocho and his colleagues showed (2001) ³² the prevalence of HBV in patients with chronic renal failure before entering into a hemodialysis program (predialysis) was 2.8%. Our prevalence of HBV in predialytic patients was lower than that found by Sit and *et al.* and nearly similar to that found by Pişkinpaşa *et al.* and López-Alcorocho *et al.*

Patients with CRF are the high risk group to exposure to hepatitis viruses due to of various reasons such as impaired humeral and cellular immune systems, blood transfusions, using the same machine and/or sharing the same room with infected patients, spreading risk of infected health staff in the dialysis period, disobeying universal rules and using immunosuppressive drugs ^{33, 34}. In CRF patients undergoing dialysis, many studies worldwide carried out to determine the prevalence of HBV in chronic renal failure. These studies have shown higher prevalence than our result. The difference between the prevalence of HBV in renal failure patients before dialysis process (predialysis period) and during the dialysis, may be attribute to that the dialysis environment increase the incidence with HBV in these patients ^{33, 34}.

Hemodialysis units have experienced outbreaks of HBV infection, with fatal cases among patients and staff. The HBV prevalence rate varies from country to country and from one dialysis unit to another. Little studies in Yemen reported the prevalence of HBV in hemodialysis to be 12% in Mukalla city³⁵, 12.6% in Hodeidah city³⁶ and 48.83% in Zabeed city³⁷. Many studies in other countries reported the prevalence of HBV in hemodialysis to be 0.9% in India³⁸, 5% in Sudan³⁹, 7% in Vietnam⁴⁰, 29.4% in Palestine⁴¹, 14% in Albania⁴², 7% in Jordan⁴³, 3.2% in Iran⁴⁴.

In present study, HBV infection found to be more in males (7 cases) as compared to females (3 cases). This may be because cultural factors induce women to focus on their health status and pay more attention to personal hygiene⁴⁵. In present study, the prevalence of HBV infection in patients on hemodialysis was highest in 41- 60 age group (4.39 %) followed by 21-40 age group (3.85%). Our analysis revealed that increased the prevalence of HBV infection among adults aged > 20 might be due to less education on health care, lack of knowledge about modes of viral transmission and the scarcity of systematically trained physicians⁴⁵. Predominant urban distribution (6 cases) of patients infected with HBV infection. The prevalence of HBV showed nearly similar among non-educated subjects (5 cases) and educated subjects (5 cases). In addition, there was a predominant non-occupant distribution (10 cases) as compared to occupant (0 cases) and this is may be due to lack of awareness about the prevention and the treatment of this infection among non-occupant patients⁴⁵. HBV prevalence differed non- significantly by age, type of residence, and the level of education but significantly by sex and occupation

5. Conclusion

In conclusion, the prevalence of HBV infection is low in chronic renal failure pre-dialysis patients.

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