Hepatitis B virus and hepatitis C virus in hemodialysis patients: A prevalence study from dialysis centers in El-Beyda and Almarj- Libya

ABSTRACT

Background: Hepatitis B virus (HBV) and hepatitis C virus (HCV) infections represent significant public health issues globally. These infection is a lead cause of morbidity and mortality among hemodialysis (HD) patients. Yet, little research has focused on the morbidity measures of these serious disorders in low and middle income countries.
Aims: The study aims to estimate the prevalence of hepatitis B and C among HD patients in El-Beyda and Almarj cities. All the patients who underwent hemodialysis from January 2013 to December 2016 were included in the study. Patients of all age groups were tested for HBsAg and anti-HCV antibodies by third regeneration linked immunoassay (ELISA).
Results: In overall, 645 patients by end of 2016, 360 males (55.8 %) and 285 females (44.2 %) hemodialysis HD patients attending were recruited. The majority of the patients were found to be >50 years of age (41.1%) followed by 31-40 years (22.5%) and thereafter in 41-50 years (18%) and lowest prevalence was observed in the age group of <20 years (8.1%). Seroconversion rates were (0.3%, 0.5%) for hepatitis B surface antigen and (1.24 %, 8.68%), for anti-HCV antibodies in El-Beyda and Almarj respectively. Patients on maintenance HD units in couple of cities have a high incidence and prevalence of HCV infection comparison to HBV infection. Additionally, patients on maintenance HD units in El-Beyda have a low levels of infection comparison to HD unit in Almarj.
Conclusion: Urgent action is required to improve infection control measures in HD centres and to reduce dependence practically on blood transfusions which consider main reasons for infection in both units.

Keywords: Hemodialysis (HD), Hepatitis B virus, Hepatitis C virus, El-Beyda, Almarj, Libya.

1. INTRODUCTION

The primary purpose of the renal system is to maintain the body's state of homeostasis by carefully regulating fluid and electrolytes, removing wastes, and providing other functions [1]. Dysfunction of the kidneys is common and may occur at any age and with varying degrees of severity [2]**.** Widespread access to dialysis has significantly increased survival in patients with chronic renal failure. During hemodialysis (HD), the patient's blood flows through a filter in a dialysis machine. Although this method can be efficient to treat renal failure, it may also lead to the transmission of some blood borne infections, such as HBV, HBC and HIV [3.4]**.** An estimated 400 million persons are carriers of HBV worldwide; 75% of whom reside in Asia and the Western Pacific, and HCV infection is estimated at approximately 170 million people globally [5]**.**

The reported prevalence and incidence of HCV infection in HD patients varies from country to country and ranges between 1 and 84.6% [6]. Libya provides free access to maintenance HD for end stage kidney disease through a rapidly expanding network of centres. Although there are no national dialysis practice guidelines or infection control polices enforced by health care authorities, there is general agreement that patients on HD should be screened for HBV and HCV infection before the initiation of HD and monitored every 3–6 months thereafter [7]**.** A national serological survey for HBV and HCV infections among the general population was performed in Libya during 2003 and revealed prevalence of 2.2% and 1.2% for HBV and HCV, respectively [8]**.** Other local surveys reported that the rate of HBsAg positivity among blood donors ranged from 1.3% to 4.6% [9]**,** while the rate of HCV antibodies was 1.2% [10]**.** Very recently study in El-Beyda and Almarj reported that the frequency of HBsAg and HCV antibodies positive cases among blood donors were 0.21% and 0.24% respectively [11]**.**

In case of hemodialysis patients, previous study conclude that patients on maintenance HD in Libya have a high incidence and prevalence of HCV infection and lower rates of HBV infection [12]. However, there are very few studies on the prevalence of such dual infections in HD patients from Northeast of Libya. Therefore, the present study was undertaken to estimate the prevalence of HBV and HCV among HD patients in El-Beyda and Almarj cities from 2013 till 2016.

2. MATERIAL AND METHODS

This descriptive study was carried out in HD units treating patients in El-Beyda and Almarj cities from January 2013 to December 2016. They are only couple of units in both cities were received the majority of patients in the littoral and outskirt regions, which have a population of more than 500,000 inhabitants. Data on the patient demographic characteristics, including their age, gender, area of residence, and duration of dialysis treatment were gathered from patient files. Before dialysis began, all cases were evaluated for HCV and HBV and considered positive if anti-HCV antibodies or HBs-Ag were detected. Sero-positivity to HBV was defined by detection of hepatitis B surface antigen (HBs-Ag) and sero-positivity to HCV by detection of anti-HCV antibodies by a third generation enzyme linked immunoassay (ELISA). ELISA tests were performed in the hospital laboratory.

3. RESUL

This study carried out in the 4 consecutive years (January 2013-December 2016). A total number of patients was found 78, 162, 177 and 228 in 2013. 2014, 2015 and 2016 respectively (Die cases were excused). A total number 645 patients (360 males, 285 females) were enrolled at both haemodialysis units. Demographic patients' characteristics are presented in Tables 1 and 2. Prevalence of patients was increased among a years of study from 78 in 2013 to 228 in 2016. Out of the total 645 patients, 55.8 % were males and 44.2 % were females. Highest prevalence was noted in age group of > 50 (41.1%). While, patients in the 31-40 years of age group were (22.5%), followed by 41-50 years of age group (18%) and then followed by 21-30 years (10.2%). Lowest prevalence was observed in the age group of <20 years (8.1%) (Table1). The geographical distribution was detailed in Table 2, the prevalence patients was high in urban area 48 % comparison with rural area 36.8 %. It also prevalence of visitors was increased during 2014 and 2015, most of them enrolled in Almarj's HD unit and all of them from Benghazi city as a result of politic situation (Table 2). Table 3 was displayed the prevalence of hepatitis among patients in each unit separately. When subjects were examined according to the presence of hepatitis B, HBsAg positivity was detected in 0.3% (n = 2), 0.5% (n=3), and anti-HCV was positive in 1.24% (n=8), 8.68% (n=56) in HD unites in El-Beyda and Almarj respectively.

Table 1. Demographic characteristics among haemodialysis patients over 4 years**.**

AGE (YEARS)	2013		2014		2015		2016		%	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
< 20	1	3	6	8	5	8	10	11	**3.4%**	**4.7%**
21-30	2	2	11	9	10	6	15	11	**5.9%**	**4.3%**
31-40	14	8	21	15	23	15	27	22	**13.2%**	**9.3%**
41-50	6	6	15	12	18	16	24	20	**9.8%**	**8.4%**
> 50	21	15	39	26	42	34	50	38	**23.6%**	**17.5%**
TOTAL	**44**	**34**	**92**	**70**	**98**	**79**	**126**	**102**	**55.8%**	**44.2%**

Table 2: The geographical distribution of haemodialysis patients in couple of cities.

PARAMETER	2013		2014		2015		2016		%	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
RURAL	19	15	22	27	29	34	51	40	**18.8%**	**18%**
URBAN	25	19	31	34	34	40	67	60	**24.3%**	**23.7%**
VISITOR	0	0	39	9	35	5	8	2	**12.7%**	**2.5%**

Table 3: Incidence of hepatitis B and hepatitis C among haemodialysis patients.

El-Beyda

YEARS	HCV	HBV
2013	**6**	**0**
2014	**0**	**1**
2015	**0**	**1**
2016	**2**	**0**
%	**1.24%**	**0.3%**

Almarj

YEARS	HCV	HBV
2013	**1**	**0**
2014	**16**	**0**
2015	**37**	**1**
2016	**2**	**2**
%	**8.68%**	**0.5%**

4. DISCUSSION

End-stage kidney disease is now a worldwide pandemic. In Libya has also increased exponentially in recent decades [13]**.** In this study carried out on HD unit in El-Beyda and Almarj cities, we have shown the prevalence of patients was increased among years of study, it also shown the highest prevalence was noted in age group of > 50 (41.1%), and the lowest noted in age group of <20 (8.1%). This result similar to previous results have reported that, the prevalence rates were low in young adults and a steady increase with age peaking in the 55–64-year age group [7,12]**.** Patients diagnosed with chronic renal failure on maintenance HD pose a higher risk for acquiring HBV or HCV infections due to frequent use of blood and blood products and multiple invasive procedures performed in these patients [14]**.**The literature review points to the fact that viral hepatitis is a serious threat for HD patients as 1.9% of all deaths among this population are related to the consequence of viral hepatitis [15]**.** The results from our study demonstrate that, the prevalence of HBsAg and HCV infections in HD patients were 0.3% & 1.24%, in El-Beyda and 0.5% & 8.68% in Almarj respectively. This finding is similar to many studies that have reported in Arab countries, the prevalence of chronic HBV among HD patients ranged from 2.0 % in Morocco [16]**,** to 11.8 % in Bahrain [17]**.** In Jordan, the prevalence of HBV was found to be 5.9 % [18]**.** Recently study among HD in India was also found the prevalence of HCV infection 1.5% and HBV 0.8% [19]**.** In Egypt, only 1.1 % were infected with HBV and 9.3 % with HCV [20]**.** However our result was lower than other study in Middle East, the prevalence of HCV antibodies among HD patients has been reported to range from 27 % in Lebanon to 48.9 % in Syria [21]**.** Our results have also showed the prevalence of HCV was higher than HBV among HD patients. This agree with previous study conclude that patients on maintenance HD in Libya have a high incidence and prevalence of HCV infection and lower rates of HBV infection [12]**.** Since both of these viruses share a common mode of transmission, we looked for the occurrence of coinfections among the cases studied. Among present cases, dual infection with HBV was seen in two patients in El-Beyda and three patients in Almarj, while HCV was seen in eight patients in El-Beyda and fifty-six patients in Almarj. Most of them were visitors from Benghazi during 2014& 2015, and they get long time of duration of dialysis. Patients with dual infection of HBV or HCV were also having

history of transfusion of blood (Table 3). Duration of dialysis is an important risk factor for acquiring infections as it is related to nosocomial transmission and dissemination of the infections in the dialysis units [14]**.** Another factor contributing to the higher rates is the enhanced risk of coinfections among chronic renal failure patients on HD due to multiple transfusions and invasive procedure performed in these patients [21]**.**

CONCLUSION AND RECOMMENDATION

In conclusion, patients on maintenance HD in El-Beyda and Almarj cities have a high incidence and prevalence of HCV infection and lower rates of HBV infection. The factors associated with HBV and HCV infection are highly suggestive of nosocomial transmission within HD units. Urgent action is required to improve infection control measures in HD centres and to reduce dependence on blood transfusions for the treatment of anaemia. The data presented were obtained during the recent conflict in Libya. It is possible that disruption of services due to the conflict may have exacerbated the problem of hepatitis virus infection in HD patients.

CONSENT

It is not applicable.

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