

## Prevalence of Viral Hepatitis (B and C) in Pediatric Hemodialysis Centers in Baghdad

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### ABSTRACT:

#### BACK GROUND:

Viral infection (hepatitis B and C) is a public health problem, especially in high risk patients, including the patients with chronic kidney disease on hemodialysis.

#### OBJECTIVE:

To find out the prevalence of hepatitis B virus and hepatitis C in children on haemodialysis unit in three paediatric haemodialysis centers in Baghdad.

#### PATIENTS AND METHODS:

This is a retrospective study which was carried out for six months data collection from (Jan. 2017 to December 2017) in three haemodialysis centres (children welfare hospital, Ibn al-Baladi Hospital for pediatric and central teaching hospital of pediatric) in Baghdad; all patients from (April 2013 to December 2017) at least six months on haemodialysis were included in study records, reviewed and analysed. Information's including demographic characteristics, history of blood transfusion, history of hepatitis B vaccination, serological investigations before starting of haemodialysis and serial monthly investigations of virology. The positive ELISA test for hepatitis B surface antigen (HBsAg) and hepatitis C antibody (HCV Ab) was recorded. The real time polymerase chain reaction (RT\_PCR) had been done to confirm positive cases, follow up of antibody titer and in suspicious cases also done.

#### RESULTS:

Total number 178 of patients; 87 (49%) male and 91(51%) female. The overall prevalence of hepatitis C antibody (HCV Ab) positive patients were 24 (13.4%), while prevalence of hepatitis B surface antigen (HBsAg) positive patients were 2(1.1%); seroconversion to hepatitis C antibody positive after hemodialysis were 14 (7.9%), while seroconversion to hepatitis B was 0 (0.0%) .

#### CONCLUSION AND RECOMMENDATION:

Hepatitis C viruses' infection are not uncommon among hemodialysis patients in Baghdad. Blood transfusion and hemodialysis are risk factors for Hepatitis C viruses' infections. Infection control within dialysis units is of paramount importance.

**KEY WORDS:** hepatitis B and C, hemodialysis centers, children.

### INTRODUCTION:

The Hepatitis B virus (HBV) and hepatitis C virus (HCV) infections are important causes of morbidity and mortality among hemodialysis (HD) patients and cause problems in the management of these patients .because these patients do not clear these viral infections efficiently<sup>(1)</sup>.

Haemodialysis (HD) patients are at high risk for the viral hepatitis because of blood transfusions, prolonged vascular access and the exposure to

infected patients and contaminated equipment<sup>(2,3)</sup>.

Acquiring an HBV and/or HCV infection has long-term impact on morbidity and mortality of HD patients. It has been suggested that HCV seropositivity is associated with cardiovascular deterioration and death in HD patients<sup>(4)</sup>. The prevalence of HCV infection in nephrology units is high and has been reported to range from 5 to 54 % .While HBV infection is less prevalent than HCV in HD units (3.6%)<sup>(6,7)</sup>. The main reasons for such a high incidence of HCV infections are the high prevalence of HCV infection in the general population, lack of standard infection precautions and effective vaccination, inadequate disinfection

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procedures of dialysis machines and other medical equipment and the spread of infection from patient to another patient, especially in dialysis centres with a high percentage of infected patients<sup>(8)</sup>.

The diagnostic procedures used in the evaluation of HCV infection are detection of anti-HCV antibodies, identification of HCV RNA, counts of virus copies, and identification of its genome<sup>(9,10)</sup>.

As a result of potential exposure to blood-contaminated equipment, hemodialysis patients are at risk of acquiring blood-borne viruses. The prevalence of HCV infection in HD patients varies widely (5-60%), influenced by factors, such as regional HCV prevalence, infection control techniques, and historical blood transfusion screening<sup>(11)</sup>.

Risk factors for HCV infection in dialysis patients include number of blood transfusions, duration of HD and mode of dialysis, prevalence of HCV infection in the dialysis unit, previous organ transplantation, intravenous drug use, male gender, older age, previous HBV infection and nosocomial transmission of HCV in HD unit<sup>(12,13)</sup>.

Viral hepatitis B remains a major hazard for both patients and medical staff of HD units<sup>(14)</sup>. The implementation of universal screening of blood products for HBsAg has reduced transmission of the HBV significantly<sup>(15)</sup>. Nevertheless, new infections are still occurring and HBV infection is still a significant cause of liver disease worldwide<sup>(16)</sup>. The key to further reducing disease burden is to understand the current modes of transmission and device and implement appropriate preventive measures. However, most of hepatitis virus infection do not have an acute symptomatic phase and thus, are only identified years after the infective event. This is true for all but a small proportion of infections, the exact size of which is yet to be defined<sup>(17)</sup>.

### **THE AIM OF THIS STUDY:**

To find out the prevalence of hepatitis B virus and hepatitis C in children in haemodialysis units in three haemodialysis centres in Baghdad.

### **PATIENTS AND METHODS:**

A retrospective study was done for six months of data collection from (June 2017 to December 2017) in three pediatric haemodialysis centers (children welfare hospital, Ibn al-Baladi Hospital for pediatric and central teaching hospital of

pediatric) in Baghdad; during the period from (4th of April 2013 to 30th of December 2017) all patients attended for at least six months on haemodialysis were included in study records, reviewed and analyzed.

Information's were taken from medical record of the patients in HD centers.

The questionnaire included the following data:

- 1) Demographic characteristics: age and gender.
- 2) History of blood transfusion.
- 3) History of hepatitis B vaccination and the serological investigations before the onset of HD. The state of patient regarding hepatitis C and hepatitis B before the onset of HD and serial monthly investigations of virology. Follow up for at least 6 months.

- 4) Duration on HD in cases of Seroconversion to hepatitis C and hepatitis B after hemodialysis.

All patients who were on HD were sent monthly for virology screen and for at least six months were followed up for Serological markers for hepatitis B and hepatitis C.

Exclusion criteria: we excluded patients who were lost follow up and didn't come to dialysis schedule regularly.

patients' samples were sent for anti-HCV antibody and HBsAg detection by 4th generation ELISA kits (CTK Biotech, Inc. from USA) for qualitative detection of HBsAg and antibody to Hepatitis C virus. Diagnostic test for patients infection depend on ELISA Positive result. Positive ELISA samples were isolated and sent samples of sera sent to RT-PCR (Real-TM Quant Dx, Sacace Biotechnologies Srl Como, Italy) in Private nursing home hospital laboratories for quantitative detection of HCV RNA and Hepatitis B virus DNA titers and patients with Positive cases had been sent to gastroenterology center in Baghdad medical complex for appropriate management.

Ethical consideration: approval was taken from Arab Board Medical Specialization. The information was digitally saved without children names'.

Statistical analysis:-

SPSS version 22 was used for data entry and analysis. Frequency and percentage was used to represent the categorical data. Chi-square test (Fischer exact test if not applicable) was used to confirm significance.  $p < 0.05$  was considered significant. Statistical analysis of the study was done by the community medicine specialist.<sup>(22)</sup>

Limitation of the study:

## VIRAL HEPATITIS (B AND C) HEMODIALYSIS CENTERS

1-Not all pediatric hemodialysis centers in Baghdad city were included in the study, for example AL Karama teaching hospital center and Immamain Kathimain teaching hospital center.

2-Longer follow up time needed for patients.

3- Short duration of the study.

4-patients from other city how came and do HD for short period

### RESULTS:

The total No. of 178 patients were included in our study, 91(51.1%) female and 87(48.9%)

male. The age range from <5-18 years.(2.2%) of them were less than 5 years,38.8% were in age 5-10 years,56.7% were in age group10-15 years and 2.2% of them were less than 18 years.

Medical records of patients on HD in each center which were included in the study as follow: 66 patients from children welfare hospital HD center, 88 patients from central teaching hospital of pediatric HD center and 24 patients from Ibn al-Baladi Hospital for pediatric HD center.

**Table 1: Demographic characteristics of studied groups.**

		No.	%
gender	Male	87	48.9%
	Female	91	51.1%
Age group/year	<5	4	2.2%
	5-10	69	38.8%
	10-15	101	56.7%
	>15	4	2.2%
No.(%) of patient in HD center	children welfare hospital HD center	66	37.1%
	central teaching hospital of pediatric HD center	88	49.4%
	Ibn al-Baladi Hospital for pediatric HD center	24	13.5%

The ratio between female to male was 1.046%.

The table (2) shows the status of hepatitis B and C viral infection before and after starting hemodialysis. There was no seroconversion to HbsAg after starting of HD (0.0%). The total number of anti-HCV Ab +ve were 24 (13.4%).

Regarding gender distribution of positive HCV Ab cases the female were 13(7.3%) of patients and male 11(6.1%). 10(5.6%) were infected before starting HD, while 14 (7.9%) of patients seroconverted to positive HCV Ab +ve serology after starting HD.

**Table 2: Hepatitis B and C viral infection before and after hemodialysis.**

	No. (%) Before starting HD	No. (%) After starting HD	Total (No.)	P-value
Hbs Ag +ve	2(1.1%)	0(0.0%)	2(1.1%)	0.3
Anti-HC Ab +ve	10(5.6%)	14(7.9%)	24(13.4%)	0.5

A total no. of patients with seroconversion to HCV Ab +ve were 14(7.9), the time duration on HD shows: one (0.6%) of patients were infected in less than 6 months, 3(1.7%) of patients were

infected in less than 12 months on HD, while ten (5.6%) of patients were infected in more than one year, which were statistically significant (p-value=0.03). These findings were shown in table (3).

## VIRAL HEPATITIS (B AND C) HEMODIALYSIS CENTERS

**Table 3: Relationship between HD duration and seroconversion to HCV Ab +ve status.**

Duration on HD	< 6 months	6-12 months	>12 months	Total No.	P-value
No. of seroconversion to HCV Ab +ve	1 (0.6%)	3(1.7%)	10(5.6%)	14(7.9%)	0.03

Table (4) The patients who received blood before HD were 115 (64.6%), while all patients in our study received blood after HD; this due to causes like anemia or blood loss during HD and this was statistically significant with P-value (0.01).

The history of vaccination of HBV before HD was (59.5%), the remaining (40.5%) unknown if they had been completed the schedule vaccination or not, while all patients (98.8%) received HBV vaccine when they referred to HD

centers except two cases (2.2%) which were HbsAg +ve, this is statistically significant with P-value of (0.003).

from 115 patients 10 develop HCV mean 0.087 and from 178 the 14 new cases of HCV mean 0.079 and if we exclude the preexisting cases and from 168 there was 14 new cases mean .083 mean that Blood transfusion has the same risk percentage in CKD and HD, vaccination of HBV if occur in all cases had preventive measure that no new cases of HBV.

**Table 4: History of blood transfusion and vaccination pre and post hemodialysis.**

	Before HD No. (%)	After HD No. (%)	P value
History of Blood transfusion (+ve)	115(64.6%)	178(100%)	0.01
Vaccination of Hepatitis B	106(59.5%)	176(98.8%)	0.003

**Table 5: Hepatitis (HBsAg) according to age groups.**

Age groups	HBV			p-value
	Positive No. (%)	Negative No. (%)	Total No.	
<5	0(0%)	4(100%)	4	0.9
5-10	1(1.4%)	68(98.6%)	69	
10-15	1(1%)	100(99%)	101	
>15-18	0(0.0%)	4(100.0%)	4	

Total number of patients with HCV Ab +ve were 24(13.4%); 10 (5.6%) patients of them were positive before starting of HD and 14 (7.9%) after starting HD. The age group of them as the

following: 10 cases (5-10 years), 14 cases (10-15 years) which were statistically significant (p-value 0.002). All these finding were showed in table 6.

**Table.6: Hepatitis C (Anti HCV Ab) according to age groups.**

Age groups	HCV Positive		Negative Total	p-value
	No. (%)	No. (%)	No.	
<5	0(0.0%)	4(100.0%)	4	0.002
5-10	10(14.5%)	59(85.5%)	69	
10-15	14(13.9%)	87(86.1%)	101	
>15-18	0(0.0%)	4(100.0%)	4	

**DISCUSSION:**

The present study, high light prevalence of HCV and HBV infections in patients on HD in pediatric age group and there is no Iraqi study done about this problem previously.

In our study, the overall prevalence of HBsAg in HD patients in three pediatric HD centers in Baghdad had been found in two (1.1%) of patients. This prevalence is lower than similar pediatric study for patients with chronic kidney diseases on HD in Iran which showed (2.5%) and Egypt (50%)<sup>(18,19)</sup>

5- Blood transfusions is a risk factor for acquiring HBV infection; but in this study only two patients had hepatitis B before HD and no patient acquired hepatitis B infection after starting HD. This could be explained by implementing the vaccination program, hepatitis screening for all patients with ELISA tests, with the use of dedicated machines for infected patients.

No significant relationship was found between HBV prevalence and gender of the patients in our study this result similar to study in Pakistan while in pediatric study in Iran there was more prevalence in female than in male<sup>(18,20)</sup>

Regarding the prevalence of hepatitis B according to age groups, there were no significant relationship was found similar to a result in Pakistan study.<sup>(20)</sup>

In general, the overall incidence of HBV infection in dialysis patients is decreasing over the years as a result of routine screening of blood products for HBsAg, the advent of recombinant human erythropoietin, HBV vaccination and the implementation of infection control measures<sup>(21)</sup>.

Regarding hepatitis C, the prevalence of anti-HCV among HD patients in our study was 24 (13.4%). Because patients on HD considered

immune compromised sometime negative ELISA test does not exclude HCV infection so it is better to send all suspected cases for PCR; also HCV-positive patients had been underwent PCR to confirm the current infection and to start treatment according to viral load . In comparison with same pediatric study for patients with chronic kidney diseases on HD in Iran which showed prevalence of HCV infection in (1.4%)<sup>(22)</sup>

Blood transfusion was found to had same risk percentage in CKD and HD for HCV infection .this result is in agreement with other study.<sup>(22)</sup>

No significant relationship was found between HCV prevalence and gender of the patients in our study, where female 13(7.3%) and male 11 (6.1%), while in pediatric study in Iran there was more prevalence in female than in male<sup>(18)</sup>

The results from our study found that the risk of HCV infection increased with increasing the long time duration of hemodialysis; in addition to continuous hemodialysis session, where seroconversion from HCV Ab negative to positive had been documented in 14(7.9%) of patients which acquired the infection after HD where we found it statistically significant with P- value (0.03), This result was in agreement with other study in Egypt<sup>(19)</sup>.

Regarding the prevalence of hepatitis C according to age group, it was statistically significant, the low No. of patients below 5 years because difficult in arranging vascular excess in dialysis in this age group, also the low No. of patients more than 15 years because that patient was referred to adult dialysis units. Similar to a study in Pakistan.<sup>(20)</sup>

The reduction in HCV prevalence in HD patients is a common trend in many countries and it was chiefly related to the reduction in the number of blood transfusions in HD patients and the improvement of the lab. Screening techniques for detection of anti-

HCV antibodies in blood donors. From the comparison our results with other studies results we can see that the prevalence of HCV infection in patients on HD is highly variable but obviously higher than in the general population.<sup>(23)</sup>

Therefore it's essential to limit the hepatitis viruses' infection by extremely observation of infection control measures<sup>(23)</sup>

### CONCLUSION:

HCV and Hepatitis B viruses' infection are not uncommon among children on HD in Baghdad as in many regions of the world.

### Recommendations:

Infection control measures are essential to limit Hepatitis viruses' transmission in HD centers. Within dialysis units, nursing staff must take adequate precautions and implement appropriate practice that will substantially reduce the risk of transmission of infection to patients and staff within high risk environment. Immunization with vaccination to HBV before starting of HD will reduce infection.

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