

# Frequency of Hepatitis C Virus and Hepatitis B Virus among Children undergoing multiple Blood Transfusions

TASNEEM KOUSAR<sup>1</sup>, RIZWANA QURESHI<sup>2</sup>, BHAG CHAND LOHANO<sup>3</sup>, CHETAN DAS<sup>4</sup>, SONIKA HOTWANI<sup>5</sup>

<sup>1</sup>Assistant Professor of Paeds, Suleman Roshan Medical College Tando Adam

<sup>2</sup>Senior Registrar of Paeds, Ghulam Muhammad Mahar Medical College Sukkar

<sup>3</sup>Registrar, Paeds Department, LUMHS Jamshoro

<sup>4</sup>Professor of Paediatrics Department, LUMHS Jamshoro

<sup>5</sup>Medical student, LUMHS/ Jamshoro

Corresponding author: Dr. Tasneem Kousar, Email: [dr.tsneemkousar@yahoo.com](mailto:dr.tsneemkousar@yahoo.com)

## ABSTRACT

**Objective:** To evaluate the frequency of hepatitis C virus and hepatitis B virus among children underwent multiple blood transfusions at tertiary care Hospital.

**Methodology:** This cross-sectional retrospective study was conducted at paediatrics department of Liaquat University of Medical and Health Sciences. All the children below the age of 12 years, both gender and presented with history of multiple blood transfusions due different hematological disorders at paediatrics department were included. After taking complete medical history, all the children underwent screening for hepatitis B virus and hepatitis C virus. After taking verbal informed consent a 3 ml or 5ml blood sample was taken from each case and sent to the Hospital diagnostic Laboratory for the HCV and HVB screening. All the data was collected by the self-made study proforma. Data analysis was done using SPSS version 20.

**Results:** A total of 102 children were studied. The mean age of the children was  $8.57 \pm 2.97$  years and average hemoglobin level was  $9.26 \pm 2.91$ . Males were in the majority 74(72.5%). Most of the children 42(41.2%) had thalassemia. The frequency of HBV was 5.9% and HCV was 33.3% among children of multiple blood transfusions. The frequency of HCV and HBV were insignificant according to gender ( $p > 0.05$ ) and statistically significant according to numbers of blood transfusion ( $p < 0.05$ ).

**Conclusion:** It was concluded that the frequency of HCV infection was high among children of multiple blood transfusions.

**Key words:** TTI, HCV, HBV, seropositivity

## INTRODUCTION

Transfusion related transmitted infections have remained a significant health concern of population, predominantly in the cases of developing nations with transfusion-dependent Beta thalassemia.<sup>1</sup> Every year, millions of units of blood are collected from donors throughout the world because blood transfusion is critical in the treatment of patients with various ailments, notably hematological disorders. According to a record from 2013, more than 112 million units of blood were donated all across the world that year.<sup>1,2</sup> Hepatitis B and C are life-threatening viruses that cause transfusion-transmitted infections (TTIs) all over the world. Hepatitis B virus (HBV) infection is the tenth largest cause of death, with one-third of the world's population having serological evidence of HBV infection.<sup>3,4</sup> Because these infections are transmitted through blood, there are likely to be more sick people because blood safety is not effectively managed in all parts of Pakistan.<sup>5</sup> Furthermore, many healthcare workers may be infected without realizing it, and there is no standard testing for health workers.<sup>5,6</sup> Blood transfusions on the regular basis among thalassemia patients at an increased risk of catching the HCV virus, especially if blood donors have not been properly screened for the virus.<sup>7</sup> Because thalassemia patients receive a lot of blood transfusions, their infection risk is a good indicator of the transfusion-transmitted infections risk in the population generally. If rate of the infection is lower among thalassemic cases, it means that the risk to the general public is low.<sup>7</sup> In the last four decades, consistent blood transfusions and chelation therapy have improved the longevity of individuals with thalassemia major, however

there is a danger of infections associated with blood-borne viral transmission.<sup>8</sup> As a result, tainted blood transfusion remains a major risk factor for HCV transmission. Although blood transfusion-transmitted diseases are widespread in the developing nations with weak blood safety regulations.<sup>8</sup> This study has been conducted to assess the frequency of hepatitis C virus and hepatitis B virus among multi blood transfusion children.

## MATERIAL AND METHODS

This cross-sectional retrospective study was conducted at paediatrics department of Liaquat University of Medical and Health Sciences. The study duration was six months. All the children blow or equal the age of 12 years, both genders and presented with the history of multiple blood transfusions due to different hematological disorders at paediatrics department were included in the study. All the cases with history of less than two blood transfusions and those who were refusing to the participation in the study were excluded. After taking complete medical history, all the children underwent screening for hepatitis B virus and hepatitis C virus. After taking verbal informed consent, a 3 or 5 ml of blood sample was taken from each case and sent to the Hospital diagnostic Laboratory for the HCV and HVB screening and to assess the hemoglobin level as per laboratory protocol. All the data was collected by the self-made study proforma. Data analysis was done using SPSS version 20. Categorical variables were analyzed in the form of frequency and percentage, while numerical date was computed in the form of mean and standard deviation. Stratification was done with respect to the number of blood

transfusions and gender. Chi-square test was applied and a p-value  $\leq 0.05$  was considered as significant.

**RESULTS**

A total of 102 children were studied. The mean age of the children was  $8.57 \pm 2.97$  years and average hemoglobin level was  $9.26 \pm 2.91$ . Males were in the majority 74(72.5%) and females were 28(27.5%). As per indications of blood transfusions, most of the children 42(41.2%) had thalassemia, followed by ALL 19.6% and AML 7.8%, while 31.4% children had other indications of blood transfusion and numbers of the blood transfusions are presented in table.1

The frequency of HBV was 5.9% and HCV was 33.3% among children of multiple blood transfusions. Fig.1

The frequency of HCV and HBV were insignificant according to gender ( $p > 0.05$ ) and statistically significant according to numbers of blood transfusion ( $p < 0.05$ ) as shown in table 2 and 3.

Table 1. Patient's demographic characteristics n=102

| Variables                         |                                  | Statistics |
|-----------------------------------|----------------------------------|------------|
| Hemoglobin level                  |                                  | 8.57±2.97  |
| Hemoglobin level                  |                                  | 9.26±2.91  |
| Gender                            | Males                            | 74(72.5%)  |
|                                   | Females                          | 28(27.5%)  |
| Indications of blood transfusions | Thalassemia                      | 42(41.2%)  |
|                                   | Acute lymphocytic leukemia (ALL) | 20(19.6%)  |
|                                   | Acute myeloid leukemia (AML)     | 08(07.8%)  |
|                                   | Others                           | 32(31.4%)  |
| Socioeconomic status              | Poor                             | 72(70.6%)  |
|                                   | Middle                           | 26(25.5%)  |
|                                   | Upper                            | 04(03.9%)  |
| Number of blood transfusions      | 2-6                              | 02(2.0%)   |
|                                   | 7-15                             | 19(18.6%)  |
|                                   | 16-30                            | 28(27.5%)  |
|                                   | >30                              | 53(51.9%)  |

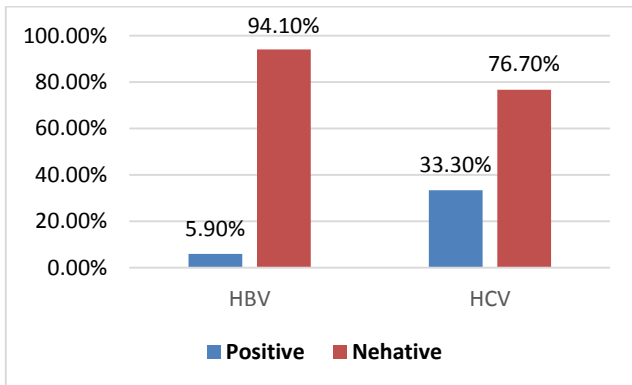


Fig 1. Frequency of hepatitis B virus and Hepatitis C virus n=102

Table.2 Frequency of HBV according to gender and numbers of transfusions n=102

| Variables                    |              | Hepatitis B virus |          | p-value |
|------------------------------|--------------|-------------------|----------|---------|
|                              |              | Positive          | Negative |         |
| Gender                       | Males        | 4                 | 70       | 0.739   |
|                              | Females      | 2                 | 26       |         |
| Number of blood transfusions | 2-6          | 0                 | 2        | 0.001   |
|                              | 7-15         | 0                 | 19       |         |
|                              | 16-30 Or >30 | 6                 | 75       |         |

Table.3 Frequency of HCV according to gender and numbers of transfusions n=102

| Variables                    |              | Hepatitis C virus |          | p-value |
|------------------------------|--------------|-------------------|----------|---------|
|                              |              | Positive          | Negative |         |
| Gender                       | Males        | 4                 | 70       | 0.739   |
|                              | Females      | 2                 | 26       |         |
| Number of blood transfusions | 2-6          | 0                 | 2        | 0.001   |
|                              | 7-15         | 4                 | 15       |         |
|                              | 16-30 Or >30 | 29                | 54       |         |

**DISCUSSION**

In many parts of the world, transfusion-transmitted infections (TTIs) are still a big concern.<sup>9</sup> Patients with -thalassemia reliant on blood transfusions are more vulnerable to TTIs. HCV is the commonest transfusion-transmitted infections, followed by HBV infection and human immunodeficiency virus (HIV) among thalassemia patients.<sup>10,11</sup> In this study average age of the study participants was  $8.57 \pm 2.97$  years and males were in the majority 72.5%. Consistently, Saeed U et al<sup>3</sup> reported that the patient's average age was 9.26 years and males were in majority 59.92%. Alternatively, Aziz S et al<sup>12</sup> demonstrated that the patient's average age was  $24.74 \pm 14.41$  years and they found females 52.5% and males 47.5%. In this study the HBsAg was positive in 5.9% and HCV infection was 33.3% among cases of multiple blood transfusions. Similarly, in the study of Aziz S et al<sup>12</sup> stated that HBsAg was positive in 7.0% cases and Anti HCV reactive was in 28.6% of the study cases. In the study of Saeed U et al<sup>3</sup> also reported that overall HBV infection was 3.08% and HCV infection was 55.73%. Although the frequency of HCV in multi-transfused Egyptian patients ranged from 10% to 55%.<sup>13</sup> In agreement of our findings, Al-Moshary M et al<sup>14</sup> reported that the found prevalent in 23.66 and hepatitis B virus was 4.87% followed by HIV 1.39%. Ahmed Kiani R et al<sup>9</sup> reported that TTIs were found in 25.3% of the 1253 individuals who had numerous transfusions and HCV was observed to be positive among 21.7% of the cases, HBV was positive among only 3.0% of the cases, and HIV in six study subjects 0.5%. The incidence of HCV and HBV varied from some studies and this may be because of the small sample size of our study and sample selection criteria.

In this study, as per indications for blood transfusions, most of the children 42(41.2%) had thalassemia, followed by ALL 19.6% and AML 7.8%, while 31.4% children had other indications of blood transfusion. Although in the study of Kebudi R et al<sup>15</sup> reported that among total 70 leukemia-diagnosed cases, mostly were acute lymphoblastic leukemia patients and only one patient was of acute myeloid leukemia.

In this study, the frequency of HCV and HBV were insignificant according to gender ( $p > 0.05$ ) and statistically significant according to numbers of blood transfusion ( $p < 0.05$ ). Although Namasopo SO et al<sup>16</sup> demonstrated that HCV infection was found in 2.5 percent of the 244 children with an average age of  $10 \pm 4.8$  years, who attended SCC in the year of 2003 from July to November and age-related increases in prevalence were statistically significant ( $p = 0.03$ ). The use of blood transfusions was a crucial element in the spread of HCV and children who gets recurrent blood transfusions should be screened for Hepatitis C, and blood testing for HCV prior to transfusion would help limit the disease's occurrence.<sup>16</sup> There was a

strong limitation of the current study that data was collected previously and on that time mostly device screening method was used for the HCV and HBV screening and these findings also correlated with the study of Al-Sweedan SA et al<sup>17</sup> as anti-HCV was shown to be more common in individuals who got blood transfusions before 1993 (83.7%) than in those who received it after 1993. (16.3 percent) ( $p=0.000$ ).<sup>17</sup> Hence, further large sample size studies are recommended to explore the recent incidence of HCV and HBV among cases undergoing multiple blood transfusions.

## CONCLUSION

It was concluded that the frequency of HCV infection was high among children of multiple blood transfusions. This was a small sample size retrospective study, therefore further large-scale multicentral studies should be done to assess the recent prevalence of transfusion-transmitted infections.

## REFERENCES

1. Bhuyan GS, Noor AU, Sultana R et al. Frequency of Hepatitis B, C and HIV infections among transfusion-dependent Beta Thalassemia patients in Dhaka. *Infectious Disease Reports*. 2021 Mar;13(1):89-95.
2. Menitove, J.E. What is it all about? *Transfusion* 2017;57;1585–87.
3. Saeed U, Waheed Y, Ashraf M, Waheed U, Anjum S. Estimation of hepatitis B virus, hepatitis C virus, and different clinical parameters in the thalassaemic population of capital twin cities of Pakistan. *Virology: research and treatment*. 2015;6:VRT-S31744.
4. Waheed Y, Rahat TB, Safi SZ, Qadri I. Epidemiological patterns and risk factors associated with hepatitis B virus in Pakistani population. *Asian Biomed*. 2010;4:547–554
5. Ahmed S, Ayub M, Naeem M et al. Thalassemia Patients from Baluchistan in Pakistan Are Infected with Multiple Hepatitis B or C Virus Strains. *The American journal of tropical medicine and hygiene*. 2021 Apr;104(4):1569.
6. Waheed Y, Siddiq M, Jamil Z, Najmi MH, 2018. Hepatitis elimination by 2030: progress and challenges. *World J Gastroenterol* 24: 4959–4961
7. Akhtar S, Nasir JA, Hinde A. The prevalence of hepatitis C virus infection in  $\beta$ -thalassemia patients in Pakistan: a systematic review and meta-analysis. *BMC public health*. 2020 Dec;20(1):1-9.
8. Ghafoor MB, Memon FA, Saleem M, Shabbir R. Transfusion Transmitted Infections in Multiple Transfused Thalassemia Patients in Rahim Yar Khan. *Journal of Liaquat University of Medical & Health Sciences*. 2021 Apr 8;20(1):31-6.
9. Ahmed Kiani R, Anwar M, Waheed U, Asad MJ, Abbasi S, Abbas Zaheer H. Epidemiology of transfusion transmitted infection among patients with  $\beta$ -thalassaemia major in Pakistan. *Journal of blood transfusion*. 2016;2016.
10. Ehsan H, Wahab A, Anwer F, Iftikhar R, Yousaf MN. Prevalence of transfusion transmissible infections in beta-thalassemia major patients in Pakistan: a systematic review. *Cureus*. 2020 Aug;12(8).
11. Global epidemiology and genotype distribution of the hepatitis C virus infection. Gower E, Estes C, Blach S, Razavi-Shearer K, Razavi H. *J Hepatol*. 2014;61:45–57.
12. Aziz S, Khanani R, Noorulain W, Rajper J. Frequency of hepatitis B and C in rural and periurban Sindh. *JPMA- Journal of the Pakistan Medical Association*. 2010 Oct 1;60(10):853.
13. Mahmoud RA, El-Mazary A-AM, Khodeary A. Seroprevalence of hepatitis C, hepatitis B, cytomegalovirus, and human immunodeficiency viruses in multitransfused thalassaemic children in upper Egypt. *Adv Hematol*. 2016; 2016:1–7
14. Al-Moshary M, Al-Mussaed E, Khan A. Prevalence of transfusion transmitted infections and the quality of life in  $\beta$ -thalassemia major patients. *Cureus*. 2019 Nov;11(11).
15. Kebudi R, Agasoy T, Kizilocak H, Ozdemir GN. Seroprevalence of Hepatitis B, Hepatitis C, and HIV in children with cancer at diagnosis and following therapy in Turkey: progress within the last 25 years. *Turkish Archives of Pediatrics/Türk Pediatri Arşivi*. 2019;54(2):82.
16. Namasopo SO, Ndugwa C, Tumwine JK. Hepatitis C and blood transfusion among children attending the Sickle Cell Clinic at Mulago Hospital, Uganda. *African health sciences*. 2013 Aug 30;13(2):255-60.
17. Al-Sweedan SA, Jaradat S, Amer K, Hayajneh W, Haddad H. Seroprevalence and genotyping of hepatitis C virus in multiple transfused Jordanian patients with  $\beta$ -thalassemia major. *Turk J Hematol*. 2011 Mar 1;28(1):47-51.