

# FREQUENCY OF HEPATITIS B VIRUS SURFACE ANTIGEN AND HEPATITIS C VIRUS ANTIBODIES IN PEDIATRIC PATIENTS WITH MULTIPLE TRANSFUSIONS

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## ABSTRACT

**Objective:** To determine the frequency of hepatitis B virus surface antigen (HBsAg) and hepatitis C virus (HCV) antibodies in children with hematological disorders having multiple transfusions.

**Methodology:** This descriptive cross-sectional study was conducted in the Department of Pediatrics, Lady Reading Hospital, Peshawar from December 10, 2016 to June 10, 2017. A total of 230 children with different hematological disorders who received two or more blood transfusions during the past two years were included in the study. Each child was screened for HBsAg and anti-HCV antibodies using 3rd generation commercial ELISA micro-plate kits (DIA.PRO, ITALY) according to the manufacturer instructions.

**Results:** Out of 230, 122 (53%) patients were males and 108 (47%) were females. Their mean age was  $10 \pm 10.86$  years. In this study, 23% of patients were positive for anti-HCV antibodies, while 7% of patients were positive for HBsAg. Out of 53 patients positive for hepatitis C antibodies, 55% were males. Similarly, out of 16 patients positive for HBsAg, 56% were males.

**Conclusion:** The frequency of anti-HCV antibodies was 23% and HBsAg was positive in 7% of all children who received multiple transfusions in the past two years.

**Key Words:** Hepatitis B virus surface antigen, Hepatitis C virus antibodies, Multiple transfusions, Pediatric patients

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## INTRODUCTION

Regular blood transfusion improves the overall survival of patients with hematological diseases and other acute emergencies but carries a definite risk of blood-borne infections especially hepatitis-B (HBV), hepatitis-C (HCV), human immuno-deficiency virus (HIV) and some bacterial pathogens. HBV infection occurs throughout the world with a total prevalence of more than 2 billion known infected cases and an annual mortality rate of more than one million<sup>1</sup>. A study conducted by Ali et al in 2011 showed that the overall prevalence of hepatitis-B in general population of Pakistan is 4.3% while it is 6.2% in patients having multiple-transfusions<sup>2</sup>. Another study conducted in Egypt showed that the prevalence of HBsAg is 29% in patients having multiple transfusions<sup>3</sup>. Similarly, the prevalence of HCV infection is increasing worldwide<sup>4</sup>. It is estimated that over 170-200 million people are infected worldwide with a prevalence of up

to 49% in patients having multiple transfusions<sup>5,6</sup>. The use of greater amount of blood transfusion is associated with a high risk of infections<sup>7</sup>.

Multi-transfused children are vulnerable to get hepatitis virus more commonly because the health of donor and blood is not properly assessed for the presence of these infections. In previous days, proper screening methods were not available but with the advancement of technology we can adopt latest techniques to detect these microbes easily. Using the conventional laboratory kits in screening programs are less sensitive in detecting hepatitis in the donated blood<sup>8</sup>. Rigorous donor screening, testing procedures and suitable donor selection programs have dramatically reduced transmission of HCV via transfusion of blood products in the present days, but there are still many countries where standards of blood product management do not adequately protect chronically transfused patients especially those having blood disorder<sup>3,9</sup>.

Globally around 85 million units of blood is transfused annually, making transfusion the most frequently performed procedure<sup>5</sup>. The rate of hospitalization with transfusion of blood products has almost doubled from 2000 till 2013 with an 80.6% increase. This increase in the blood transfusions was not totally associated with an increase in the total number of hospital admissions<sup>10</sup> and it is still increasing.

β-thalassemia major patients are among the high-risk groups for blood transfusion-related infections<sup>11,12</sup>. There is lack of literature regarding the burden of transfusion-transmitted infections in Pakistani population having thalassemia, sickle cell anemia, fanconi anemia, hemophilia and leukemias<sup>13,14</sup>. The present study was undertaken to investigate the frequency of hepatitis-B and hepatitis-C in pediatric patients having different hematological disorders requiring multiple blood transfusions<sup>15,16</sup>.

**METHODOLOGY**

This descriptive cross-sectional study was conducted in the Department of Pediatrics, Lady Reading Hospital, Peshawar over a six months period from December 10, 2016 to June 10, 2017. Ethical approval was obtained from the Ethical Committee of Lady Reading Hospital Peshawar. A total of 230 patients were included in the study through non-probability convenient sampling technique keeping sample size according the WHO sample size calculator 2. All children having multiple-transfusions from 1 to 18 years of age were included. Patients with family history of chronic hepatitis, unconscious and drug abusers were excluded from the study. Patients fulfilling the inclusion criteria were admitted to the Department of Pediatrics, after an informed consent and were screened for HBsAg and anti-HCV antibodies. A blood sample of 5ml was collected from each patient under aseptic conditions in a sterile gel-tube, labeled and screened for HBsAg and anti-HCV antibodies by 3rd generation Enzyme Linked Immunosorbent Assay (ELISA) using micro plate kits (DIA.PRO, ITALY).

All the results were entered into a structured proforma and analyzed in SPSS version 20. Mean ± standard deviations (SD) were calculated for quantitative variables such as age. Frequency and percentages were

calculated for categorical variables such as gender, primary disease, anti-HCV antibodies and HBsAg by ELISA. Patients with HCV and HBV were stratified among age and gender; and a p value <0.05 was considered significant. Data were presented in the form of tables.

**RESULTS**

Out of 230 patients, 149 (65%) were in the age range of 1-10 years while 81 (35%) were in the age range of 11-18 years. Mean age was 10 ± 10.86 years. Gender distribution among 230 patients showed that 122 (53%) patients were males and 108 (47%) were females.

Frequency of anti-HCV antibodies and HBsAg was analyzed and found that 23% patients were positive for anti-HCV antibodies while 7% were positive for HBsAg. Gender distribution of anti-HCV antibodies and HBsAg is shown in Table 1.

**DISCUSSION**

In this study, 23% of patients were positive for anti-HCV while 7% were having HBsAg by ELISA method. The higher frequencies of hepatitis C in our population may be due to non-availability of the vaccine for its prevention. Jain et al<sup>17</sup> had reported that out of 96 patients, 1.04% were positive for HBsAg while 25% were positive for anti-HCV antibodies which support the higher frequency of HCV in the present study. Similarly, another study conducted by Mansour et al<sup>3</sup> reported that out of 200 patients, 39 (19.5%) were positive for anti-HCV antibodies by RIBA method, 58 (29.0%) were positive for HBsAg and 13(6.5%) were positive for anti-HBc antibodies. Older age of children and increased number of transfusions were significantly associated with a higher prevalence of hepatitis C and hepatitis B. Hepatitis C was highly prevalent in these pediatric patients receiving multiple transfusions<sup>3</sup>.

Similarly, we found that the ratio of hepatitis C antibodies and hepatitis B surface antigen in males to females was (55% to 45%) and (56% to 44%) respectively. This showed that male patients were having more transfusion dependents hepatitis C and B infections and our findings are supported by another study conducted by Khattak et al in 2013 at district Swat on multi-transfused

**Table 1: Frequency and gender distribution of anti-HCV antibodies and HBsAg in pediatric patients with multiple transfusions**

| Gender | Anti-HCV antibodies (n=53) | HBsAg (n=16) |
|--------|----------------------------|--------------|
| Male   | 29 (55%)                   | 9 (56%)      |
| Female | 24 (45%)                   | 7 (44%)      |
| Total  | 53 (100%)                  | 16 (100%)    |

beta-thalassemia major patients<sup>18</sup>. The higher rates of infections in male patients may be due to more males in the study population of both studies.

### LIMITATIONS

Sample size was small in the present study. Number of blood transfusions done in each of these cases were not considered due to the unavailability of reliable records.

### CONCLUSION

The frequency of hepatitis C antibodies was 23% and HBsAg was 7% in children with hematological disorders having multiple transfusions in the past 2 years.

### RECOMMENDATIONS

Children with hematological disorders requiring multiple transfusions could be protected by proper blood screening. Safe blood transfusion programs must be initiated at national level to overcome the high prevalence of blood borne infections.

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### CONTRIBUTORS

MH conceived the main idea, wrote the manuscript and reviewed as an expert pediatrician. MI Assisted in manuscript writing, data analysis and follow up, IU helped in data analysis, references, final review and corrections. KAK helped in data collection and assistance in manuscript writing. All authors contributed significantly to the submitted manuscript