

**Original Article**

## **Prevalence of Hepatitis C Virus Infection in Multi-transfused Thalassaemia Patients in Bangladesh**

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### **Abstract**

**Background:** *Thalassaemia is one of the most common hereditary diseases worldwide including Bangladesh. Multitransfused thalassaemia patients may acquire hepatitis C virus infection in spite of currently practicing screening schedule. It is postulated that there are some pitfalls in the currently practicing screening system behind the transmission of HCV in transfusion-dependent thalassaemia patients.* **Objectives:** *To find out the prevalence of hepatitis C virus infection in transfusion-dependent thalassaemia patients and thereby to see the efficacy of currently practicing screening schedule for hepatitis C virus.* **Materials and Methods:** *This cross-sectional study was conducted from 1<sup>st</sup> December, 2015 to 30<sup>th</sup> November, 2016 at Dhaka Shishu (Children) Hospital Thalassaemia Center (DSHTC). Three hundred and twenty patients of multitransfused  $\beta$ -thalassaemia major and Hb E  $\beta$ -thalassaemia aged 3–18 years were enrolled. History was taken and physical examination was done. Blood specimens were collected and sent to the standard laboratory for detection of antibody against hepatitis C virus.* **Results:** *Among the subjects, 174 (54.3%) were male and 146 (45.7%) were female. Out of total 320 patients, 75 (23%) were  $\beta$ -thalassaemia major and 245 (77%) were Hb E  $\beta$ -thalassaemia. Among the 320 thalassaemia cases, 47 were found positive for anti-HCV with an overall prevalence of 14.7%.* **Conclusion:** *Despite screening of blood donors by Rapid Device (Strip) Method, HCV infection remains an important cause of viral hepatitis infection among multitransfused thalassaemia children.*

**Key words:** *Thalassaemia; Donor screening; Blood transfusion; Hepatitis C*

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### **Introduction**

Thalassaemia is one of the commonest hereditary diseases worldwide. It is an important health problem, causing much morbidity, early mortality and a lot of financial and emotional miseries for a family.<sup>1</sup> After iron overload blood-borne infections are the main cause of death in thalassaemia patients.<sup>2</sup> Patients with  $\beta$ -thalassaemia major who regularly receive transfusion are at risk of developing post-transfusion hepatitis. Among these infections, hepatitis B and C are the most

common.<sup>3</sup> It is well known that hepatitis C virus (HCV) is a major cause of post-transfusion hepatitis infection, and it can lead to hepatitis with long-term complications like cirrhosis and hepatocellular carcinoma.<sup>4</sup> A lot of studies among multi-transfused thalassaemia patients reported the prevalence of HCV in  $\beta$ -thalassaemia patients at a wide range of 3–67%.<sup>5–9</sup> Mean age, duration and mean amount of blood transfused have been associated with an increased risk of HCV infection in  $\beta$ -thalassaemia patients.

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Thalassaemia is an important health problem in Bangladesh. Dhaka Shishu (Children) Hospital Thalassaemia Center (DSHTC) has diagnosed 701  $\beta$ -thalassaemia major and 2307 Hb E  $\beta$ -thalassaemia in the last decade (according to the data of DSHTC). Many other diagnostic centres in Bangladesh do haemoglobin electrophoresis and diagnose enormous thalassaemia cases. About 30–40 thalassaemia patients are getting blood transfusion in Dhaka Shishu (Children) Hospital Thalassaemia Center (DSHTC) daily. They collect blood from Bangladesh Red Crescent, Quantum and Sandhani Blood Donation Centers and Dhaka Shishu (Children) Hospital Blood Bank from patients' self donors after proper screening by Rapid Device (strip) method according to WHO Guideline<sup>10</sup> and National Guidelines 2013 of Screening Donated Blood for Transfusion Transmissible Infections in Bangladesh.

A study in Dhaka Shishu (Children) Hospital showed that the prevalence of HCV infection in  $\beta$ -thalassaemia patients was 18.5%.<sup>11</sup> It is postulated that there are some pitfalls in the currently practicing screening system behind the transmission of HCV in transfusion-dependent thalassaemia patients. Keeping in mind the issue of pitfalls this study was done to estimate the prevalence of HCV infection in transfusion-dependent thalassaemia patients in Dhaka Shishu (Children) Hospital Thalassaemia Center (DSHTC). This study result could be used to develop more effective donor screening as well as prevention strategies against HCV transmission.

### Materials and Methods

This cross sectional study was conducted in Dhaka Shishu (Children) Hospital Thalassaemia Center (DSHTC) during the period from 1<sup>st</sup> december 2015 to 31<sup>st</sup> November 2016.  $\beta$ -thalassaemia major and Hb E- $\beta$  thalassaemia were confirmed by Hb electrophoresis and High Performance Liquid Chromatography (HPLC), and by DNA analysis when needed in children aged from three years to eighteen years. Children on regular blood transfusion in different thalassaemia centres of Dhaka City and hospitals throughout the country were enrolled. Using a predesigned questionnaire, demographic data such as age, gender, source and duration of receiving blood transfusion were obtained.

Complete history was taken and physical examination

was carried out in all these patients and blood specimens were collected to test for HCV. All the specimens were sent to the standard laboratory recommended by our centre for analysis. HCV infection was tested for every one by detecting serum anti-HCV antibody using the enzyme-linked immunosorbent assay (ELISA) method and in some cases (those were under treatment for HCV) HCV RNA real time-polymerase chain reaction (RT-PCR) was done. Data were analysed by Statistical Package for Social Services (SPSS) version 16.0.

### Results

In this study total 320 thalassaemia patients were enrolled as study subjects. The mean age of the subjects was  $9.4 \pm 3.2$  years (3–18 years). Among the study subjects 174 (54.3%) were male and 146 (45.7%) were female.

Out of 320 subjects 75 (23%) were  $\beta$ -thalassaemia major and 245 (77%) were Hb E  $\beta$ -thalassaemia (Fig 1). Out of 320 thalassaemia cases 47 were found to be positive for anti-HCV, given an overall prevalence of 14.7% (Fig 2). The mean age of positive cases was higher than the negative cases ( $10.3 \pm 3.4$  vs  $7.6 \pm 3.7$ ).

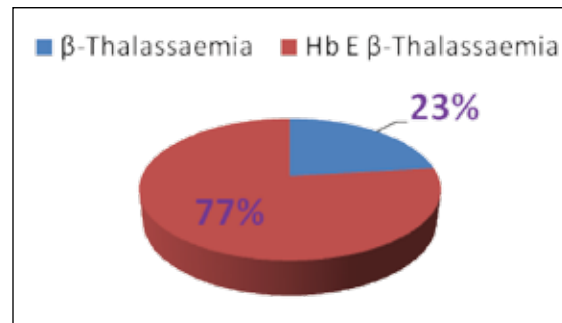


Fig 1. Type of thalassaemia patients (n=320)

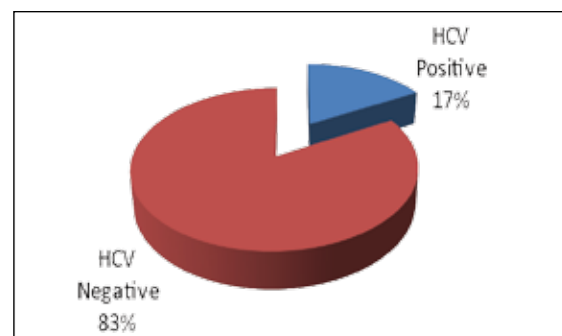


Fig 2. Distribution of HCV infection status of thalassaemia patients (n=320)

## Discussion

In this study, among 320 cases, 77% patients were diagnosed as Hb E  $\beta$ -thalassaemia and 23% were diagnosed as  $\beta$ -thalassaemia major which correlates with the prevalence in South-East Asia.<sup>12</sup> In this study the prevalence of male and female patients was 54.3% and 45.7% which is also similar to another study.<sup>13</sup>

As the study was conducted in a paediatric hospital (Dhaka Shishu Hospital Thalassaemia Center), all the patients were of 3–18 years (mean age  $9.4 \pm 3.20$  years) age group which was similar to another study.<sup>14</sup>

Among 320 thalassaemia cases 47 were found positive for anti-HCV giving an overall prevalence 14.7%. This prevalence rate is similar to the studies in Dhaka Shishu (Children) Hospital<sup>11</sup> and in India in which prevalence was 18.5%<sup>11</sup> and 16.7%<sup>15</sup>. In different parts of the world, the prevalence of HCV infection in thalassaemia patients is different. In Malaysia 22.4%<sup>16</sup>, Karachi 20.5%<sup>17</sup> and in Thailand 23.8%<sup>18</sup> which are close to the findings in our study. In Italy the prevalence of HCV infection in thalassaemia patients was 47%<sup>19</sup>, in Iran 63.8%<sup>20</sup> and in Rawalpindi of Pakistan 60%<sup>21</sup>. This is higher than that of our study. It is a known fact that the hepatitis infection in thalassaemia patients is mostly related to blood transfusion.<sup>13</sup>

The causes of higher incidence of anti-HCV positivity might be due to lacking of higher quality-category donor screening facilities like ELISA method and, due to collection of blood during donor window period.<sup>13</sup>

Another study revealed that the prevalence of HCV infection was higher in those thalassaemia patients who received comparatively more blood transfusion in comparison to those thalassaemia patients who received less blood transfusion.<sup>18</sup>

Despite screening of blood donors by Rapid Device (Strip) Method, HCV infection remains an important cause of viral hepatitis infection among multitransfused thalassaemia children. There might be pitfalls in donor screening by this method, especially during donor window period. So, steps should be taken to improve the donor screening procedure by implementing the ELISA method as well as addressing the donor window period and thereby reduce the prevalence of HCV infection in blood recipients.

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