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## Short Communication

# Incidence of Hepatitis B and C Viruses in Thalassaemia Major Patients

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**Authors' Contributions**
**AF designed the study, collected samples, tested them and wrote the manuscript. UW helped in sampling and analysis of data. Ma and HA supervised the work. AA and AR provided valuable guideline and helped in sampling.**

**Key words**
**Hepatitis B virus, Hepatitis C virus, β-thalassaemia, Thalassaemia major patients.**

## ABSTRACT

Thalassaemia is an inherited genetic disorder of haemoglobin. It is estimated that about 100,000 patients are presently suffering from thalassaemia major, the severe form of the disorder. The patients of β-thalassaemia are dependent upon lifelong blood transfusion. Multiple transfusions expose them to many blood borne diseases, most commonly hepatitis B and C. The aim of current study was to determine the prevalence of HBV and HCV infections among thalassaemia major patients. The study was conducted from June – December 2016, at the Thalassaemia Centre, Shaheed Zulfiqar Ali Bhutto Medical University, Islamabad and the Pakistan Thalassaemia Centre, Pakistan Baitul Mal, Islamabad, Pakistan. Data were obtained by clinical testing of 1,440 ß thalassaemia major patients visiting for blood transfusions at regular intervals. The confirmatory screening for HBV and HCV was performed through Chemiluminescent Immunoassay (CLIA). Of the total 1,440 patients studied, 930 (64.6%) were males and 510 (35.4%) were females. The patient age ranged from 1 to 30 years were with mean age of 7.9±4.5 years. Among 1,440 patients, 44 patients were positive for HBV (3.05%) while 295 were positive for HCV (20.4%). This study showed that β-thalassaemia patients are at a higher risk of contracting HBV and HCV infections. Although the professional blood donors are a great risk but major concern is related to screening techniques and different laboratories are practicing variable quality of screening blood screening. All diagnostic techniques must be regulated under a standard quality control and a nation wise validation study is highly recommended.

β-thalassemia is among the most common genetic disorders in the world. It occurs due to genetic defects in the process of haemoglobin synthesis. β-thalassemia major is caused by defect in beta globin chain synthesis and is the main clinical manifestation of this phenotype of disorder (Pasricha *et al*., 2013). Approximately 1.5% of the population is estimated to be carriers for β-thalassaemia with 50–60,000 new thalassaemia patients being born each year (Colah *et al*., 2010). β-thalassaemia is mostly prevalent in population of the Mediterranean region but also found in Africa, Southeast Asia, and the Middle East (Viprakasit *et al*., 2009). Children born with beta thalassemia major are normal at birth, but develop severe anaemia during the first year of life and they require repeated blood transfusions. This is associated with risks of exposure to many blood born viral diseases including Hepatitis B and C (Cunningham *et al*., 2004).

Thalassaemia incidence in Pakistan is on the rise. It is estimated that about 100,000 patients are presently suffering from thalassaemia major, the severe form of the disorder. Every year this number is increasing by 5000–9,000 (Ansari *et al*., 2011). As thalassaemia patients are dependent upon lifelong blood cell administration from blood donors, therefore risk for recipient increases further in a country that is already endemic with hepatitis B and hepatitis C. Post transfusion hepatitis infections may cause hepatic fibrosis and cirrhosis, increasing the mortality and morbidity rate in thalassaemic patients. Hepatitis B virus

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(HBV) infection is considered as the 10th leading cause of mortality, and it is estimated that one-third of world's population has serological evidence of HBV (Waheed *et al*., 2012; Hakim *et al*., 2008; Noor *et al*., 2008). The situation is also not as good in Pakistan regarding prevelance of HBV and HCV. Some earlier studies have reported HBV in 1.7% and 4.6% in blood donor population of Pakistan showing a regional variability in prevalence (Angelucci and Pilo, 2008; Waheed *et al*., 2010). A recent study detected 3.92% HBsAg positive individuals in selected population of various districts of Punjab (Naser *et al*., 2017). It is estimated that 5% - 10% of Pakistan's population up to 19 million people have been infected by HCV. An epidemic of this scale is unprecedented and is not subsiding anytime soon; there are approximately 240,000 new cases diagnosed in Pakistan every year (Akbar *et al*., 2009; Qureshi, 2014).

As per WHO recommendations all donations must be screened for most common viral diseases including HBV and HCV. The screening method should be very accurate, sensitive and precise under strict quality control. This screening becomes more critical for countries which are having incensing prevalence of blood borne diseases.

This article describes seroprevalence of HBV and HCV in thalassaemia patients of the capital (Islamabad) of Pakistan.

*Material and methods*

This cross sectional study was performed between January to September 2016, at the Pakistan Institute of Medical Sciences, Islamabad, the largest tertiary care hospital in federal capital and at the Pakistan Thalassaemia Centre, Pakistan Baitul Mal, Islamabad. The study was approved by the ethical committee of the Department of Bioinformatics and Biotechnology, International Islamic University, Islamabad, Pakistan.

Patients/guardians of the patients gave their written, informed consent to participate in the study, which was conducted in accordance with the principles of the Declaration of Helsinki. Among all patients, β-thalassaemia type major was considered as inclusion criteria, whereas patients with a-thalassemia type minor/major or patients having β-thalassemia type minor were excluded. The registered patients belong to different ethnic groups and the diversity represents the whole Pakistani population. Data was obtained from 1,440 β- thalassemia major patients aged one year or more receiving regular blood transfusions at a major transfusion center in Islamabad Pakistan.

Blood was collected from patients aseptically and serum separated Eppendorf tubes and stored at –20°C. Screening for HBV and HBV were performed through Chemiluminescence Immunoassay (CLIA) technique on Abbott ARCHITECT® i2000 system. CLIA is a method to determine the concentration of samples according to the intensity of the luminescence that the chemical reaction emits. The advantage of CLIA is significantly increased sensitivity and dynamic range, which allows detection of lower analyte concentrations and hence earlier diagnosis of disease. The detection was done by using accurate diagnostic, USA. Statistical analysis was conducted on study variables via the assistance of Statistical Package for Social Sciences (version 17.0) using 95% confidence interval.

*Results*

Of the total 1,440 patients studied, 930 (64.6%) were males and 510 (35.4%) were females. The patient's age ranged from 1 to 30 years with mean age of 7.9±4.5 year. The mean age on first transfusion was 9.56±8.0 months. The mean age at 1st transfusion was 8.5 months. Most of the patients (55%) were from age 1 to 12 years while rest of patients (45%) were of more than 12 years. Out of 1440 patients, 44 were positive for HBV, of which 25 (56.8%) were males and 19 (43.2%) were females. Among hepatitis B positive, 26 (59.09%) were of less than 12 years of age while 18 (40.91%) were more than 12 years of age. A total of 61.12% had a family history of thalassaemia. Among 1440 patients, 295 were positive for HCV (20.4%), of which 187 (63.4%) were males and 108 (36.6%) were females. Out of these HCV positive patients, 203 (68.8 %) were of less than 12 years of age while 92 (31.2%) patients were of more than 12 years of age. The results are shown in Table I.

**Table I.- Prevalence of HCV and HBV in thalassemia patients related to their age and gender included in study.**

| Factors | No. of patients (n= 1440) | Positive patients | |
|---|---|---|---|
| | | Hepatitis B (n= 44) | Hepatitis C (n= 295) |
| Male, n (%) | 930 (64.6%) | 25 (56.8%) | 187 (63.4%) |
| Female, n (%) | 510 (35.4%) | 19 (43.2%) | 108 (36.6%) |
| Age of all patients (Mean±SD) | 7.9 ± 4.5 | 10.6 ± 6.4 | 9.3±4.0 |
| Age of patient | | | |
| <12 year | 55% | 26 (59.09%) | 203 (68.8%) |
| >12 year | 45% | 18 (40.91%) | 92 (31.2%) |
| Age on first transfusion (months) | | 9.56 ± 8.0 | |

*Discussion*

There is a high prevalence of hepatitis B in beta thalassaemia major patients and the blood transfusion is

one of major risk factors. In Pakistan, 7–9 million people are living with HBV with an approximate carrier rate of 3%–5% (Saeed *et al*., 2013). In the current study we have found 3.0 % of HBV in the thalassemia patients, however sero-prevalence studies have been conducted on blood transfusion populations from Peshawar, Rawalpindi, Abbottabad, Multan, Bahawalpur, Quetta, and Karachi, which depicted HBV prevalence rates of 2.51%, 1.9%, 3.3%, 1.55%, 4.93%, 2.69%, and 4.90%, respectively (Mujeeb and Mehmood, 1996; Ahmad *et al*., 2000, 2004; Khattak *et al*., 2002; Asif *et al*., 2004; Fayyaz *et al*., 2006; Jehangir *et al*., 2006; Khan *et al*., 2007).

On the other hand the prevalence of HCV is also at consistent increase. In Islamabad, the prevalence reported in recent years is 33% in selected group of population (Rafaqat *et al*., 2005). The prevalence of HCV in the general adult population, pediatric population, young population applying for recruitment, injecting drug users, and multi-transfused population was 4.95%, 1.72%, 3.64%, 57%, and 48.67%, respectively (Luby *et al*., 1997).

The current study shows 20.4 % of HCV in thalassemia patients. The other studies conducted by Jaiswal *et al*. (2001) reported 21.0% cases of HCV and Jamal *et al*. (2005) reported 22.4% cases of HCV. There are studies in contrast to our study as well. Younas *et al*. (2012) witnessed that 42% of their β-thalassaemia patients had HCV. Moreover, Al-Sheyyab *et al*. (2001) reported 40.5%, Mansour *et al*. (2012) and Al-Hawsawi (2000) reported 40% of HCV cases.

The donor blood screening programs need to be reconsidered and effective screening methods are required to prevent the transmission of these viral infections. The donor blood screening method policy should be implemented at national level under strict quality control. Currently in Pakistan, different blood screening methods are prevalent in different public sector hospitals. Strict controls needs to be imposed on quality parameters of detection methods. The professional blood donors are also a great risk as there is no federal policy regarding the registration of donors.

A national health campaign is also obligatory to spread awareness among mass about safe blood transfusion and threat of exposure to viral diseases.

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*Statement of conflict of interest*

We declare that there is no conflict of interests regarding the publication of this article.

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