# A recent highlight on the incidence and prevalence of HBV and HCV in multitransfused children

## Thesis

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# Abstract

New children Hospital of Cairo University and receiving washed filtered blood regularly. All Candidates were subjected to detailed history taking, thorough clinical examination, and Laboratory evaluation including: complete blood count, liver enzymes, serological tests for HBV( serum HBs Ag and Serum Hepatitis B Core Antibody IgM) and for HCV(Anti-HCV antibody).



Key word:

Incidence

Prevalence

HBV HCV

# List of abbreviations

| Abbreviation | Original Word |
|---|---|
| AIDS | Acquired immune deficiency syndrome |
| ALT | Alanine aminotransferase |
| Anti-HBc | Antibody to hepatitis B core antigen |
| Anti-HBs | Antibody to HBV surface antigen |
| APTT | Activated partial thromboplastin time |
| CJD | Creutzfeldt - Jakob disease |
| CMV | Cytomegalovirus |
| DDAVP | 1-deamino-8-D-arginine vasopressin |
| DIC | Disseminated intravascular coagulation |
| EBV | Epstein - Barr virus |
| ECMO | Extracorporeal membrane oxygenation |
| EFS | Event-free survival |
| EIA | Enzyme immunoassay |
| FDA | Food and Drug Administration |
| FFP | Fresh frozen plasma |
| FNHTR | Febrile nonhemolytic transfusion reactions |
| GBV-C | GB virus C |
| GVHD | Graft versus host disease |
| HAI | Histologic Activity Index |
| HAV | Hepatitis A virus |
| HBcAg | Hepatitis B core antigen |

| | |
|---|---|
| HBeAg | Hepatitis B e antigen |
| HBs Ag | Hepatitis B surface antigen |
| HBV | Hepatitis B virus |
| HBV DNA | Hepatitis B virus DNA |
| Hct | Hematocrite |
| HCV | Hepatitis C virus |
| HDV | Hepatitis D virus |
| HEV | Hepatitis E |
| Hgb | Hemoglobin |
| HGV | Hepatitis G virus |
| HHV-4 | Human herpesvirus 4 |
| HHV-5 | Human herpesvirus 5 |
| HHV-6 | Human Herpesvirus 6 |
| HHV-8 | Human Herpesvirus 8 |
| HIV | Human Immunodeficiency Virus |
| HIV NAT | HIV nucleic acid amplification testing |
| HLA | Human leucocyte antigen |
| HPV-B19 | Human parvovirus B19 |
| HTLV-I/II | Human T-Lymphotropic Viruses type I and II |
| IFN-alpha | Interferon alfa |
| MALT | Mucosa-associated lymphoid tissue lymphoma |
| MU/m² | Million units per square meter |
| NAT | Nucleic acid testing |
| NHL | Non-Hodgkin's lymphoma |

| | |
|---|---|
| PCR | Polymerase chain reaction |
| PT | Prothrombin time |
| RBCs | Red blood cells |
| RDP | Random donor platelets |
| REAL | Revised European American Lymphoma |
| RIA | Radioimmunoassay |
| RMSF | Rocky Mountain Spotted Fever |
| SDP | Single donor platelets |
| SEN-V | SEN virus |
| SVR | Sustained virological response rate |
| TA-GVHD | Transfusion-associated graft-versus-host disease |
| TRALI | Transfusion-associated acute lung injury |
| TSEs | Transmissible spongiform encephalopathies |
| TTM | Transfusion transmitted malaria |
| TTP | Thrombotic thrombocytopenic purpura |
| TTV | TT virus |
| WBCs | White blood cells |

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## Introduction:

Hepatitis B and hepatitis C virus infections are considered to be important health problems worldwide **(Peksen, 2004).**

More than 400 million people are chronically infected with hepatitis B virus (HBV) all over the world. At least 20-30% of them will die of complications of chronic liver disease including liver cirrhosis and cancer. This led the world health organization (WHO) to place HBV in the top 10 causes of death worldwide **(Gish and Locarnini, 2004).**

In pediatric patients, HBV accounts for 10-20% cases of acute hepatitis and remains the most important cause of chronic hepatitis **(Singh and Pradhan, 2003).**

WHO estimated that more than 227 million individuals have been infected with hepatitis C virus (HCV) and more than 170 million are carriers of HCV all over the world. Of persons with chronic hepatitis C, 10-20% will develop cirrhosis and 1-5% will develop hepatocellular carcinoma **(El-Kamary et al., 2003).**

The prevalence of HCV antibodies is reported to be higher in Egypt than any other country **(Arthur et al., 1997).** Studies of the epidemiology of HCV infections have suggested that the Nile Delta region of Egypt has among the highest prevalence rates of HCV in the world with seroprevalence rates of 30-40% in those over the age of 30-yrs **(Darwish et al., 2001).**

## Rational background:

HBV can be spread by transfusion of infected blood or coagulation factor concentrates. In the 1960, the risk of transfusion-associated HBV was 50% and Hepatitis B surface antigen (HBsAg) was detected in up to 60% of patients with post transfusion hepatitis **(Anderson and Ness 2000).**

Although the exclusion of paid donors and the application of HBV serological screening dramatically reduced incidence of HBV infection to the extent that only 80 cases of transfusion-associated HBV infection are reported in the United States annually**,** post-transfusion HBV continues to be the most common cause of hepatitis B due to the fact that screening of donor blood units for HBsAg does not exclude all blood units infectious for HBV **(Pereira,2003).**

Hepatitis C virus accounts for more than 90% of post transfusion chronic hepatitis and cirrhosis **(Wiley et al., 2002)**.

In fact, blood transfusion remains an important past and a potential current risk for HCV transmission in developing countries, where anti–HCV screening is limited by technical and financial factor **(Lesi and Kehind, 2003).**

Repeated blood and blood product transfusions in many pediatric diseases such as beta-thalassemia major, sickle cell anemia, hemolytic anemia, hemophilia and aplastic anemia, is necessary for patient survival. However, they will increase exposure to HBV and HCV infections **(Al-Shayyab et al., 2001).**

## Objective:

The aim of this study is to evaluate the annual incidence of HBV and HCV in diseased Egyptian children who received blood transfusion with special stress for new cases who received blood in less than 1 year. Variety of patients are receiving blood or blood product transfusion especially new cases attending hematology clinic of pediatric hospital of Cairo university in the last six months and coming one year. They include hemolytic anemia cases (thalassemia, sickle cell anemia), aplastic anemia and hemophilia. Work will be done for one year duration.

All patients will be subjected to:

- Thorough history taking for their diagnosis and history of exposure to blood or blood products in detail.
- History of vaccination to HBV.
- Thorough clinical examination.
- Liver function tests.
- Screening for hepatitis HBsAg and screening for antibody to hepatitis B core antigen (IgM).
- Screening for hepatitis C antibody by enzyme-linked immunoassay III.
- Statistical analysis: Essential statistical analysis will be arranged.

## Hypothesis:

In most countries, blood donations are routinely screened for HBsAg as well as for HCV, human immune deficiency virus (HIV) and syphilis **(Mollah et al., 2003).**

In Egypt, screening for HCV is based on detection of antibodies to recombinant antigens which include antigens from structural and non-structural regions. Second generation assay for HCV was used in Kasr Al-Aini hospital blood bank in the early 1990. Third generation assay (ETI-AB-HCVK-3) was first used in Kasr Al-Aini hospital blood-bank in 1998 and is still used till this moment.

In the early 1976, HBsAg detected by hemeagglutination was used in Kasr Al-Aini hospital blood-bank hospital .Further; HBsAg detected by enzyme immuno assay (ET1-MAK-4) was first used in Kasr Al-Aini hospital blood-bank in 1980 and is still used till now.

Although screening for HCV and HBV has reduced the risk of infections from transfusion of blood and blood products, new infections continue to occur either due to donor infections that escape detection or by inefficient decontamination of products during preparation **(Irshad and Peter, 2002).**

Accurate estimates of the risk of transfusion of HBV and HBC infections are essential for monitoring the safety of the blood supply and evaluating the potential effect of new screening tests. The most direct way of estimating the risk associated with transfusion is to study the rate of infection prospectively in transfusion recipients **(Arora et al., 2003).**