

Hepatitis B and C Viral Infections among Individuals Attending Tobruk Medical Center, Tobruk (2003 – 2016)

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ABSTRACT

Hepatitis B and C viral infections are major public health problem in the world including Libya. Concerns regarding transmission of these pathogens in healthcare settings have grown, especially since the uprising of 2011. These concerns are related to lack of financial resources, preventive policies and increased number of illegal immigrants from endemic areas. To determine seroprevalence of HBV and HCV infections among individuals who attended Tobruk main hospital in Libya, from January 2003 to December 2016; and to raise awareness about the transmission of these viral infections in order to promote better preventive measures.

A cross sectional study of serological assays including HBs Ag and anti-HCV were performed on 343,833 individuals from different nationalities and regions, who attended Tobruk Medical Center for different medical or surgical conditions from January 2003 to December 2016.

Over 14 years, out 343,833 blood sample records, about 909 (0.3%) samples were positive with either HCV or HBV. Among 909 samples infected with HBV or HCV, there were 409 males, (45%) and 500 females (55%), and most (91.1%) of them were Libyan. The frequency of Hepatitis B surface Antigen (HBs Ag) was 35.2% and anti-HCV was 64.8%.

About 0.3% of individuals who attended Tobruk Medical Center from 2003 to 2016 were having either HBV or HCV seromarkers. A significant decrease of these infections has been observed since 2011. A further study for monitoring the spread of hepatitis infection in healthcare settings is recommended. Strict precautionary measures should be applied for the care of all patients in order to prevent transmission of these viral infections in healthcare settings.

Keywords- Hepatitis B; Hepatitis C; Illegal immigrants; Viral transmission; Serological assays.

INTRODUCTION

Hepatitis B and C viral infections are considered to be among the most important blood-transmitted viral infections and can lead to liver damage that may lead to death.¹ In Libya, the incidence of hepatitis B (HBV) and hepatitis C virus (HCV) infection remains the main health concerns for both health workers and patients.^{1,2} These concerns have increased in recent years, particularly in health screening services because preventive policies and financial resources have been inadequate. These concerns also are related to weak border control and infiltration of waves of illegal immigrants to the country especially from countries where these blood-transmitted viral infections are endemic.³ Many of these migrants may be a potential source of infection during their stay in Libya, especially in healthcare settings.^{4,5}

Libyan health authorities have implemented substantial preventive measures in recent decades to prevent of these infections both in healthcare settings and in the community. These preventive measures include implementing standard precautions in health service centers and obligate all patients to undergo pre-operative screening for HBV, HCV; in

addition, to HIV as a routine investigation.

This is to help protecting both healthcare workers (HCWs) and patients from transmission of these viral infections. Moreover, implementing HBV national vaccination programs for all new-born babies and high risk groups, such as healthcare workers (HCWs).⁶

Many studies advised that in order to enhance blood donation safety, antibodies of the total hepatitis B core antigen (anti-HBc) should be implemented along with HBs Ag blood essay to help in detecting HBV infected donors.⁷⁻¹¹ Moreover, the health authorities implemented many preventive measures such as screening of all immigrants and individuals for these pathogens as part of their premarital medical check-up.^{12,13} Also, some studies have reported a significant infection of these pathogens in healthcare centers, and have been linked these pathogen to hospital admission, blood transfusion and various dental and surgical procedures.¹⁴⁻¹⁶

No studies have previously been performed in Tobruk region to estimate the seroprevalence of hepatitis B and C viral infections among individuals attending healthcare facilities. This study was conducted to determine the seroprevalence



of HBV and HCV infections among individuals attending Tobruk Medical Centre from 2003 to 2016. The goals were to explore the extent of the problem, to raise awareness and to develop strict preventive measures to avoid transmission of these pathogens in healthcare settings.

MATERIALS AND METHODS

This study was a cross sectional type, included a retrospective analysis of consecutive blood analysis records of individuals, who were attending to Tobruk Medical Center for various medical and surgical conditions from January 2003 to December 2016. Tobruk Medical Centre is the only tertiary hospital in the city, and serves many neighboring cities. Blood analysis for HBV and HCV was performed as a routine laboratory test prior to medical intervention, invasive investigations, minor and major surgical procedures, as well as natural labors. All screening tests for blood-transmitted infections including HBsAg and anti-HCV were performed in the medical laboratory at Tobruk Medical Centre using commercially available enzyme-linked immunosorbent assays (ELISA) as part of hospital standard procedure.

Descriptive statistics were performed using SPSS Statistics Software (version20, Inc., Chicago, Illinois, USA). Pearson *Chi*-square test was used to estimate if there was any statistical significance differences between variables. In all tests, $P < 0.05$ was regarded statistically significant. Data were tabulated; different ratios were calculated using Microsoft Office Excel 2016. The study protocol was approved by the ethics committee of the Scientific Research in Tobruk University, and was performed under the supervision of Faculty of Medical Technology, Tobruk. The demographic and epidemiological data of patients were retrieved anonymously. All patients were informed about the research and gave their verbal consent.

RESULTS

Among 343,833 blood sample record, about 909(0.3%) samples were positive with either HCV or HBV over the study period (14 years), and no co-infections were found. The frequency of HBs Ag was 320(35.2%), and anti-HCV was 589(64.8%). Out of total 909 cases, 409(45 %) were males and 500(55 %) were females .

The ages of participants ranged from a few days to 96 years, with a mean of 37.75 ± 7.58 years. Most of the infections were in the older age groups (Figure 1).

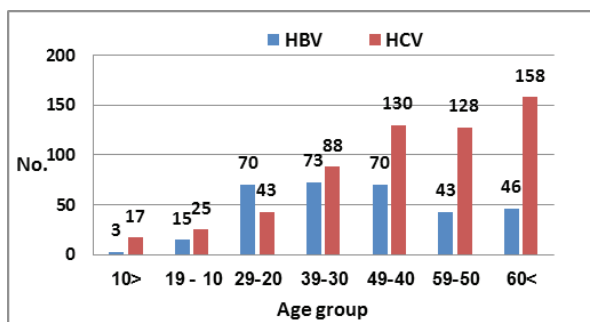


Figure 1:HBV and HCV Infections among Different Age Groups
The overall rates during period of the study were HCV

589(35.2%) and HBV 320(64.8%) respectively. The frequency of the viral infections varied among different nationalities. The highest frequency were found among Libyans with 828(91.1%) cases, of which 536 were HCV and 292 were HBV cases. This was followed by 56 Egyptian cases, of which 46 were HCV and 10 were HBV (Table 1).

Table1: HBV and HCV Infections among Different Nationalities

Nationality	HBV	HCV	Total No. (%)
American	1	0	1(0.1%)
Chadian	1	0	1(0.1%)
Egyptian	10	46	56(6.1%)
Ghanaian	0	1	1(0.1%)
Iraqi	1	0	1(0.1%)
Libyan	292	536	828(91.1%)
Mauritanian	1	0	1(0.1%)
Palestinian	3	3	6(0.7)
Sudanese	9	2	11(1.2%)
Syrian	2	1	3(0.3%)
Total	320	589	909

Steadily declining trend of seroprevalence of these viral infections was observed over the last six years from 2011 to 2016 (Figure 2). The average annual rate of these viral infections declined significantly from an average of ~93 people infected per year during 2003 to an average incidence of ~28 individuals per year during 2011 to 2016.

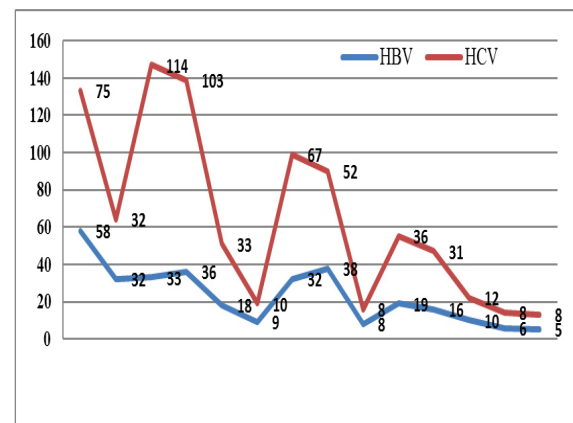
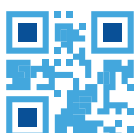


Figure 2: Trends of HBV and HCV Seroprevalence over the Study Period.

DISCUSSION

The prevalence of HBV and HCV infection among the general population in Libya is well documented. Several studies have reported the incidence of these viral infections amongst healthcare workers in the country.^{5,14-16} However, no study has documented the incidence of these infections in individuals and patients attending healthcare-providing



centers in Libya. However, this percentage (0.3 %) was very low compared with selected international studies that were conducted to assess seroprevalence of HBV and HCV among individuals and patients attending healthcare-providing centers. A study was performed in a tertiary hospital in southeast Turkey, among 43,131 individuals, about 4,472 cases (10.4%) were positive for HBsAg. Of 43,131 individual, only 28,276 were tested for anti-HCV, and approximately 323 cases (1.2%) were positive for anti-HCV.¹⁷ Seroprevalence of HBV and HCV were 3.9% and 1.76%, respectively in hospital based study conducted in Uttar Pradesh.¹⁸ Another study carried out at a tertiary care teaching hospital, Trichy, revealed that about 315 cases (1.61%) were positive for HBsAg.¹⁹

The spread of HBV and HCV infections from healthcare workers (HCWs) to patients and vice versa is well documented.²⁰⁻²⁵ Most of these reports state that the transmission occurred because of failing to apply protective barriers. However, this issue in Libya has become particularly important in recent years, as a result of weak control of borders, lack in health screening services and weak preventive policies due to inadequate financial resources.²⁶ Many illegal immigrants especially from countries, which have high epidemic rate for these pathogens, entered illegally to the country on their way to Europe may be a source of transmission of these pathogens in healthcare centers during their stay.^{14, 27} Moreover, the steadily declining incidence from 2011 to 2016 ($P < 0.001$) may be due to the deterioration of health screening services (i.e. lack of financial resources required for providing laboratory screening tests to all individuals who will have invasive medical intervention) and preventive policies.

CONCLUSION

The study demonstrated that 0.3% of individuals who attended Tobruk Medical Center from 2003 to 2016 were having either HBV or HCV seromarkers. A significant decrease of this infection has been observed since 2011.

RECOMMENDATIONS

Surveillance of occupationally acquired HBV and HCV infections and review of the efficiency of preventive measures in healthcare-providing centers should be performed regularly. In addition, conducting regular studies to estimate the spread of these infections in healthcare settings is important, to assess the extent of the problem and to encourage authorities to implement more effective programs to prevent the risk of transmission.

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REFERENCES

1. Daw MA and Dau AA (2012) Hepatitis C Virus in Arab World: A state of concern, *The scientific World Journal* 2012, 719494. doi:1100/2012/719494

2. Beltrami EM, Williams IT, Shapiro CN and Chamberland ME (2000) Risk and management of blood-borne infections in health care workers, *Clinical Microbiology Reviews* **13**, 385-407.
3. World Health Organization (2017) Hepatitis B Fact sheet. WHO.2017. Available from: <http://www.who.int/mediacentre/factsheets/fs204/en/> [Accessed on 22/3/2018].
4. World Health Organization (2018) HCV Epidemiology. WHO. Available from: <http://www.who.int/mediacentre/factsheets/fs164/en/> [Accessed on 22/3/2018].
5. Daw MA and El-Bouzedi A (2014) Prevalence of hepatitis B and hepatitis C infection in Libya: results from a national population based survey, *BMC Infectious Diseases* **14**, 17.
6. Elzouki AN (2008) Hepatitis B infection in Libya. The magnitude of the problem, *Libyan J Infect Dis* **2**, 20-25.
7. Ismail F, Shambesh M, Aboutwerat A and Elbackush M (2010) Serological and molecular characterization of total hepatitis B core antibodies in blood donors in Tripoli, Libya, *Libyan J Infect Dis* **4**, 31-37.
8. Shambesh MK, Franka E, Ismail F, Gebriil N and Azabi K (2014) Significance of screening Anti-hbc among Libyan Blood Donor: A Preliminary Study. 32th BBTS Annual Conference. Harrogate, UK: Transfusion Medicine. p. 64-5.
9. Shambesh MK, Franka EA, Ismail FF, Gebriil NM, Azabi KA and Amar F (2015) Anti-HBc and HBV-DNA among blood donors in North Africa; Western Libya, *Int Blood Res Rev* **3**, 152-159.
10. Shambesh MK, Franka EA, Ismail FF and Elostta MA (2016) Occult Hepatitis B Virus Infection among Blood Donors; North Middle Libya, *Int Blood Res Rev* **6**, 2321-7219.
11. Shambesh M, Franka E, Agila A and Ismail F (2018) Frequency of Hepatitis B core antibody and Hepatitis B Virus DNA among apparently healthy male blood donors in Eastern Libya, *Libyan J Med Sci* **2**, 12-15.
12. Ismail F, Farag A, Ilah MA (2016). Occurrence of Hepatitis B, Hepatitis C and HIV Infections among Individuals Undergoing Preemployment and Premarital Medical Examination in Mediterranean Port City Tobruk, Libya, *Int Blood Res Rev* **6** (4), 1-6.
13. Alsharif F, Ismail F and Ilah A (2017) Incidence of HBV Infections Detected During Pre-Employment Checkup in Tripoli, Libya, *The 2nd Medical Research Conference. University of Tripoli*.
14. Elzouki A-N, Elgamay SM, Zorgani A and Elahmer O (2014) Hepatitis B and C status among health care workers in the five main hospitals in eastern Libya, *Journal of infection and public health* **7**, 534-541.
15. Daw MA, Shabash A, El-Bouzedi A and Dau AA (2014) Seroprevalence of HBV, HCV & HIV co-infection and risk factors analysis in Tripoli-Libya, *PloS one* **9**, e98793.
16. Coppola N, De Pascalis S, Onorato L, Calò F, Sagnelli C and Sagnelli E (2016) Hepatitis B virus and hepatitis C virus infection in healthcare workers, *World Journal of hepatology* **8**, 273.
17. Kaya Ş, Baysal B, Temiz H, Karadağ Ö, Özdemir K and Bilman F (2014) Seroprevalence of Hepatitis B and C among Patients Admitted to a Tertiary Hospital, *Viral Hepatit Dergisi* **20**(3), 120-124.
18. Agarwal L, Singh AK, Agarwal A and Singh RP (2018) Incidental detection of hepatitis B and C viruses and their coinfection in a hospital-based general population in tertiary care hospital of Uttar Pradesh, *Journal of Family Medicine and Primary Care* **7**(1), 157-161.
19. Vazhavandal G, Vallab Ganesh Bharadwaj B, Uma A and Chitra Rajalakshmi P (2014) Seroprevalence of hepatitis B virus among patients at a rural tertiary health care centre in South India: a four year study, *International Journal of Research in Medical*



Sciences **2** (1), 310-313.

20. Elzouki A, Smeo M, Sarmud M, Elahmer O, Daw M, Furarah A, *et al* (2013) Prevalence of hepatitis B and C virus infections and their related risk factors in Libya: a national seroepidemiological survey, *East Mediterr Health J* **19**(7), 589-599.

21. Bell DM, Shapiro CN, Ciesielski CA and Chamberland ME (1995) Preventing blood borne pathogen transmission from health-care workers to patients: the CDC perspective. *Surgical Clinics of North America* **75**, 1189-1203.

22. CDC (1989) Guidelines for prevention of transmission of human immunodeficiency virus and hepatitis B virus to health-care and public-safety workers. CDC, MMWR supplements, **38**, 1.

23. Denes AE, Smith JL, Maynard JE, Doto IL, Berquist KR and Finkel AJ (1978) Hepatitis B infection in physicians: results of a nationwide seroepidemiologic survey, *Jama* **239**, 210-212.

24. Duckworth GJ, Heptonstall J and Aitken C (1999) Transmission of hepatitis C virus from a surgeon to a patient. The Incident control team, *Communicable Disease and Public Health* **2**, 188-192.

25. Tsude K, Fujiyama S, Sato S, Kawano S, Taura Y, Yoshida K, *et al* (1992) Two cases of accidental transmission of hepatitis C to medical staff, *Hepato-gastroenterology* **39**, 73-75.

26. Schlipkötter U, Roggendorf M, Cholmakow K, Weise A and Deinhardt F (1990) Transmission of hepatitis C virus (HCV) from a haemodialysis patient to a medical staff member, *Scandinavian Journal of Infectious Diseases* **22**, 757-758.

27. Daw MA, El-Bouzedi A and Dau AA (2011) Libyan armed conflict. Mortality, injury and population displacement, *African Journal of Emergency Medicine* **5**, 101-107.

