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Seroincidence of Hepatitis B Virus Infection: Eighteen-Year Results from Tobruk Medical Centre

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ABSTRACT

Hepatitis B virus (HBV) is serious blood transmitted viral infection. It causes serious liver infections and can be transmitted to individuals via contact with the body fluids of infected individuals.HBV infection remains a main health concern for both health workers and patients in healthcare settings worldwide.

This study aims to estimate the seroincidence of HBVin individuals who were admitted to Tobruk Medical Center for different medical or surgical conditions from January 2003 to April 2020. Also, to estimate its distribution based on age and sex, geographical distribution, and nationalities of the cases during the study period; in addition to increasing awareness about the spread and the way of control of this viral infection in the community.

A retrospective study of 18 years at Tobruk Medical Centre, eastern Libya. The medical records department of the hospital follows the guidelines of the international classification of diseases-10 for coding the diseases. The research estimates the frequency and distribution of HBV infection based on age, sex, geographical distribution, and nationalities during the study period from January 2003 to April 2020.

331 cases (mean age 40 ± 18.9) were found positive for HBV infection over the study period. 49.2 % of the cases were males and 50.8 % were females. The HBV infection was most prevalent in the age groups of 20-49 years (n: 220). The frequency of the disease according to the nationality was: Libyan (91%), Egyptian (3.6%), Sudanese (2.7%), and lesser substantial percentages from other nationalities. The frequency of the disease according to the region was: Tobruk (85.5%), Derna (7.6 %) small also, other less percentages from other regions.

This study reported a significant decline in the incidence of HBV infection in the last decade and this decline maybe because of the weakening of health screening services. The best way to control or eradicate HBV infection in the community is by vaccination of all newborn and high-risk groups, and to follow more strict standard precautions in healthcareproviding centers, in addition to surveillance of occupationally acquired HBV infections.

Keywords-*Hepatitis B Virus; Tobruk Medical Centre; Health Care Worker.*

INTRODUCTION

Hepatitis B virus (HBV) is a serious blood transmitted viral infection worldwide. The virus infects the liver and can cause both acute and chronic diseases.[1,2] HBV is one of main causes of liver cancer in the world.[3] WHO (World Health Organisation) estimates that in 2015, 257 million people were living with chronic HBV infection.[4] HBV infection is endemic in Asia and the Pacific islands, Africa, Southern Europe and Latin America.[5]

The epidemiology of hepatitis B can be described in terms of the prevalence of hepatitis B surface antigen (HBsAg) in a population, broadly classified into high- (>8% HBsAg prevalence), intermediate- (2%–7%), and low-prevalence (<2%) areas.[6] High-HBV prevalence is common in the Asia Pacific and sub-Saharan African regions.[7] while intermediate-HBV is common in North Africa and the Middle East, parts of Eastern and Southern Europe, parts of Latin America, and South Asia[8]Low-prevalence HBV is common in Australia, Asia, Northern,as well as Western Europe, Japan, North America, and some countries in South America.[9]

In Libya, the prevalence of HBV carriers the general population according to the latest national screening reports is 2.2%.[10]

HBV is transmitted through exposure to infected blood and bodily fluids (particularly semen and vaginal secretions).[11]

crucial preventive measures have been made by health authorities in Libya in recent decades to prevent incidences of HBV infection either in health care settings or withinthe community. These measures include implementing universal standard precautions in health service centers; such as obligatory pre-operative screening for HBV for all patients as a routine pre-intervention investigation to help protect both health care workers (HCWs) and patients. And introducing HBV national vaccination programs to all newborn babies and high-risk groups such as HCWs.[12] al also, providing more efficacious treatments to treat infections of this pathogen and providing sensitive

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screening tests to check all blood units before blood donation.

However, as for screening blood donors, several studies have recommended additional screening antibodies for the total hepatitis B core antigen (anti-HBc) as additional screening assay to HBsAg (the test that used in Libyan blood bank units) to further enhance blood donation safety[13-17], furthermore, screening for this blood transmitted pathogen is obligatory to all immigrants and individuals as a part of their pre-employment and premarital medical checkup.[18;19]

furtheremore, with all of these preventive measures, HBV infection remains a major health concern worldwide including in Libya in health care setting for both health workers and patients.[20]

Seroprevalence of HBV infection in the general population in Libya is documented, and several studies were performed to determine the incidence of HBV seromarkers among HCWsto tackle such problems among HCWs.[21,22]

However, to the best of our knowledge, no studies on the incidence of this pathogen in individuals who attend health care providing centers in the country were conducted. Therefore, this study was performed to estimate the seroincidence of HBV infection in individuals who attended Tobruk medical Centre for various reasons, alsoto explore the extent and the burden of this pathogen and to increase the awareness about the methods of spread and prevention of this important pathogen in the region.

MATERIALS AND METHODS

Study population

*T*he present retrospective study was conducted at Tobruk Medical Centre, which is located in Tobruk city is the capital of Butnan province of Libya, which is situated on Libya's Eastern Mediterranean coast, with a population of 160,000, sharing around 140 km long Mediterranean coastline, it has an international border with Egypt in the east. Tobruk Medical Centre serves neighboring cities as well as Tobruk.

The data were retrieved from the medical records of Tobruk Medical Centre. The study aims at estimating the frequency and distribution of HBV infection based on age, sex, geographical distribution, and nationalities during the study period from January 2003 to April 2020.

Ethical consideration

The data in this study were retrieved from the medical records department after the approval of the hospital ethical committee. The retrieved demographic and epidemiological data of patients were anonymous and the patient's data cannot be correlated to the results obtained.

Serological assays

HBsAg assay was performed in Tobruk Medical Centre Medical Laboratory as a routine prior intervention in cases that require contact with patient body fluids such as minor and major surgical procedures and invasive investigation as well as natural labors. The assay is performed as a measure of universal precautions to protect both patients and HCWs.

The screening of HBsAg was by enzyme-linked immunosorbent assay (HBsAg Sensitive ELISA, DIA LAB, Austria). The test was performed according to the manufacturer's instructions.

Statistical data analysis

The data were analyzed by using SPSS computer software (Version 16, SPSS Inc.). Age of patients was presented as mean ± SD, Frequencies, percentages were computed and tabulated. A chi-square test was used to highlight if there any statistical significance in differences between variables. Statistical significance used < 0.05.

RESULTS

A total of 313case were found positive for HBsAg over the study period. The ages of the infected individuals ranged from infants to 96 years, with a mean of 40.9± 16.2 years. 163 cases were males, 49.2%, and 168 cases were females, 50.8%.

Out of 331 registered HBV cases, 3 cases (0.9%) were in the age group of <10 years, 15 (4.5%) were in in the age group of 10-19 years, 70 (21.1%) cases were in the age group of 20-29 years, 76 cases (23.0%) were in the age group of 30-39 years, 74 cases (22.4%) were in the age group of 40-49 years, 45cases (13.6%) were in the age group of 50-59 years and 48 cases (14.5%) were in the age group of >60 years and above. The majority of the infections were in the older age groups in particular in age groups from 20 - 49 years (66%, 220 cases), (P= <0.05) (Figure 1).

The overall rate of HBV infection was varied among the different nationalities. The highest rates were found among Libyan (301 cases, 90.9%), followed by Egyptian (12 cases, 3.6 %) and in Sudanese the incidence was (9 cases, 2.7%) and a lesser significant percentage from different other countries (Table 1).

The majority of cases were from Tobruk region(283, 85.5%), followed by individuals who come from Derna city (25, 7.6%) and followed by Albayda city (7 cases), Benghazi (5 cases) and sporadic cases from other nearby cities.

Significant and steady declining trends of seroincidence of HBV infection were observed over the last 9 years (P< 0.05) (Figure 2).

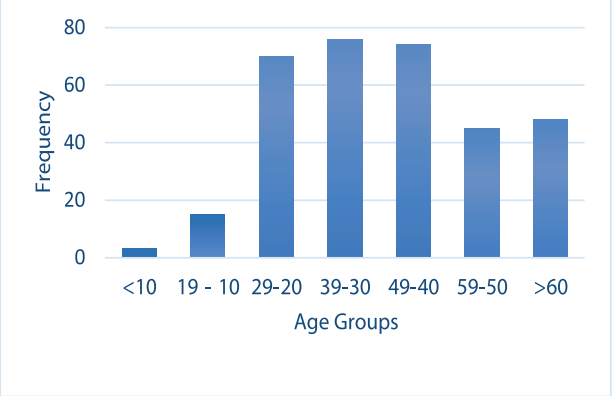

Figure 1:Seroincidence of HBV infections among different age groups

Table1: HBV Infection among Different Nationalities

Nationality	Frequency	Percentage
American	1	0.3%
Chadian	1	0.3%
Egyptian	12	3.6%
Iraqi	1	0.3%
Libyan	301	90.9%
Mauritanian	1	0.3%
Palestinian	3	0.9%
Sudanese	9	2.7%
Syrian	2	0.6%
Total	331	100.00%

Figure 2: The trends of HBV seroincidence over the study period

DISCUSSION

The study of the seroincidence of HBV infection among individuals who attended Tobruk Medical Centre, which serves neighboring cities as well, is an important step towards the estimation of the spread of this viral infection among people attending health care providing centers in the region and therefore formulating effective preventive policies to prevent transmission this pathogen in a health care setting.

This study reported an overall rate of HBV over the whole period of study (2003- April 2020 was 331, 49.2 % male and 50.8 % females, who were attending Tobruk Medical Centre for several medical and surgical conditions. HBV analysis test was performed as a routine laboratory test either before medical intervention, invasive investigations, minor and major surgical procedures, as well as natural labors.

HBV can be transmitted in healthcare settings when blood or other body fluid from an infected person enters the body of a person who is not infected. In a healthcare setting, this contact is primarily through contaminated needles, syringes, or other sharp instruments.[23]

HBV-infected individuals who attend health care providing centers are a major source of HBV infection for both health workers and other patients. The transmission of HBV infection in a health care setting in the world is well documented; several reports have studied the spread of HBV infections and its spread from HCWs to patients and the opposite. Most of these reports stated that the transmission occurred as a result of a lack of applying a protective barrier.[24-26]

In this research, a significant and steady declining trend of seroincidence of HBV infection was observed over the last 9 years; from 2011 to April 2020 ($P < 0.05$). (Figure 2) this decline may be due to deteriorated health screening services and preventive policies, i.e. lack of financial resources for screening tests to all individuals who will have invasive medical intervention.

Regular researches on HBV infection in a health care setting is important; as this kind of researches provides health authorities with the burden of this pathogen; in addition, the obtained information from such studies is needed to implement more effective preventive measures to prevent the risk of this pathogen transmission from patients to patients also from patients to HCWs. adding to that, prospective observational studies to evaluate the number of procedures that include evidence of blood contact of any type should be conducted.

CONCLUSION

The present study estimated the seroincidence of HBV infection in individuals who attended Tobruk Medical Center (2003 – April 2020). An important decline has been observed in the last 9 years, this may be due to inadequate health screening services and preventive strategies. Estimating the seroincidence of HBV infection will assist evidence-based public health preventive measures within our community and at the nationwide level.

RECOMMENDATIONS

Stricter standard precautions should be taken for the care of all patients in hospitals regardless of their presumed infection status to prevent transmission of this infection in healthcare settings more than that, conducting regular surveillance of occupationally acquired HBV infection and reviews the efficacy of the used preventive measures in health care providing centers such as using protective barriers and performing -pre-intervention blood analysis, and giving vaccination to HBV to health care workers. Furthermore, country health authorities are advised to regularly update the practice guidelines for the ideal management of the infected individuals with HBV infection.

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