

Occurrence of Hepatitis B, Hepatitis C and HIV Infections among Individuals Undergoing Preemployment and Premarital Medical Examination in Mediterranean Port City Tobruk, Libya

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Authors' contributions

This work was carried out in collaboration between all authors. Author FI designed the study, wrote the protocol, and wrote the first draft of the manuscript. Author MAI managed the literature searches. Authors FI, AF and MAI done the statistical analyses of the study. All authors read and approved the final manuscript.

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ABSTRACT

Hepatitis C Virus (HCV), Hepatitis B Virus (HBV) and Human Immunodeficiency Virus (HIV) still posed to be ultimate threats to the community in Libya. The rapid screening and identification of these infections has been the important subject of research globally to rid of these viral infections. We have reported here the incidence of HBV (6.1%) and HCV (1.2%) infections among individuals who performed preemployment and premarital medical examination in Tobruk city, Libya. The aim of the study is to identify and estimate the frequency of HBV, HCV and HIV in individuals who are undergoing pre-employment and premarital stage in Tobruk. A three years long (2014 to 2016) meticulous research study was carried out in the Public and Family Health Clinic, Tobruk. The blood samples were collected for analysis from 328 multinational public servants and premarital couples of Tobruk city. A total of 79 (24.1%) cases out of total 328 cases were Libyans and 249 (75.9%) were non-Libyan.

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The HBV infections had been detected in which 5 cases were among Libyans, 6 among Sudanese, 4 among Egyptians, 4 among Syrians and 1 among Tunisian. The HCV infection was only 1 case, found among Libyans and 3 cases among Egyptians whereas, no HIV case was found over the period of investigations.

Keywords: HCV; HBV; HIV; Tobruk.

1. INTRODUCTION

Hepatitis B and hepatitis C virus both are important members of the family hepadnaviridae and Flaviviridae respectively [1,2]. The infections associated with these viruses mainly are liver infections, such as hepatitis, hepatocellular carcinomas, and cirrhosis [3]. These viruses get easily transmitted from human to human if the contaminated blood comes in contact by any means such as blood transfusion, usages of contaminated syringe, sexual intercourse, contaminated shaving blades, razor or nosocomial act and also congenital infection from mother to baby [4]. On the other hand, the human immunodeficiency virus (HIV) belongs to the family Retroviridae subgroup of retrovirus that are responsible for HIV infection and led to acquired immunodeficiency syndrome (AIDS) [5,6]. The average survival time after infection with HIV is variable [7]. Infections of HIV take place by the transfer of blood, vaginal fluid, semen, pre-ejaculate, or breast milk. The HIV is present within these bodily fluids either as free virus particles or virus within infected immune cells. The HIV usually infects helper T cells (particularly CD4+ T cells), macrophages, and dendritic cells [8] and eventually HIV infection led to low levels of CD4+ T cells.

The world health organization (WHO) has warned all developed, developing and poor countries about the threats of viral hepatitis infections as this viral infection is not preventable by merely mass vaccinations; it needs to take actions to improve monitoring and screening process and to provide in time treatment at regional and national level [9]. The prevalence of hepatitis viral infection is found to be more in African countries according to authentic scientific reports [10,11]. The frequencies of prevalence of hepatitis infections are found to vary among African countries for lacking of uniform diagnostic methodology and timing of diagnostic research [12]. The assessment of burden of hepatitis infections in North Africa has always been hampered due to lack of sufficient supervision and resources for data collections. The hepatitis C infections burden in Egypt is alarmingly more

(12.5–26.6%) while in Libya the infections is (0.9–1.6%) lowest in the world [13,14]. Tobruk city is the capital of Butnan province of Libya, which is located on the Libya's Eastern Mediterranean coast, with a population of 160,000 (2006), sharing around 140 km long Mediterranean coastline [15].

The aim of our research is to identify the HCV, HBV and HIV infections in individuals who are undergoing pre-employment and premarital stage in Tobruk region to describe the occurrence of hepatitis and HIV infections, by drawing attention to the predisposing factors, and suggesting the strategies required to control the spread of hepatitis B and C and HIV infections.

2. MATERIALS AND METHODS

2.1 Study Location

The study was conducted at the Public and Family Health Clinic, Tobruk. Tobruk city is the capital of Butnan province of Libya, which is located on the Libya's Eastern Mediterranean coast, with a population of 160,000, sharing around 140 km long Mediterranean coastline, it has international border with Egypt in the east. The clinic is responsible for preventing infectious disease by giving mandatory vaccination to the people under government sponsored program in Libya and screening all people before marriage and before employment to prevent transmission of major blood borne viral infections.

2.2 Study Design and Data Collection

Sample collection was started in the month of March 2014 and continued up to August 2016 in the Public and Family Health Clinic, Tobruk. The blood samples were collected for clinical analysis from the individuals of multinational public servants and premarital couples of Tobruk port city.

To assess the frequency of major blood-borne viruses (e.g. HBV, HCV and HIV) a total of 328 individuals were included in the research studies and was divided into five different age interval

groups. All cases were registered from March 2014 to August 2016 in the Public and Family Health Clinic. The blood samples collected from the registered individuals were thoroughly analysed for HBsAg, anti-HCV and anti-HIV 1 & 2 using ELISA micro-wells methods. Demographic data such as person's age, sex, nationality, occupations were included in the registration form. Patients were followed up regularly until completion of their treatment. The occurrence of HCV, HBV and HIV in blood samples were thoroughly identified and compiled.

2.3 Ethical Approval

Ethical approval was obtained from the Research Committee at the University of Tobruk. Participants consent also obtained before we review their serology results.

2.4 Statistical Data Analysis

Data was analysed using SPSS computer software (Version 19, SPSS Inc.). The study population were divided into different groups. A Chi-square test was performed to examine and compare the different study variables.

3. RESULTS

3.1 Age Interval Distributions and Frequency of Infections

Ages of individuals were divided into 5 age groups (Fig. 1). The ages of 1st age group varied between 15 to 24 years and total participant were 66, ages of 2nd age group varied between 25 to 34 years and total participant were 135, ages of 3rd age group varied between 35 to 44 years and total participant were 45, ages of 4th age group varied between 45 to 54 years and total participant were 14, and ages of 5th age group varied between 55 to 64 years and total participants were 68. The HBV infections were

found to be present more or less among all age groups but 13 maximum HBs Ag positive cases were detected from 2nd age groups. The 3rd, 4th and 5th age groups have got 3, 2, and 1 HBsAg positive cases respectively. On the other hand, the 3 maximum HCV positive cases were detected from 3rd age group and 1 from 5th age group while rest of the group (1st, 2nd and 4th) did not get any HCV infections and no HIV positive cases were detected in our whole study (Table 1). As per our observation, 6.1 percent HBsAg positive and 1.2 percent HCV positive cases were detected out of 328 total participants and 92.7 percent participants were not infected in Tobruk city (Table 2). The 289 individuals (88.1%) participated in this study were for pre-employment check up and 39 individuals (11.9%) were for premarital check up. Among all (328) registered cases from March 2014 to August 2016 the domination of registered individuals were male i.e. 94.2% and female only were 5.8%.

3.2 Frequency of Viral Infections among Multinational Individuals in the Study Populations

The several nationalities who were working with Libyan government, private and public companies in the Tobruk region along with local Libyans had to go under compulsory health check up for infectious and contagious diseases in the Public and Family Health Clinic, Tobruk. In this investigation 160 Egyptians, 46 Sudanese, 14 Indian, 25 Syrian, 4 Tunisian and 79 Libyan took part (Table 3).

Hepatitis viral infections among the multinationals people were detected during study period. HBV infection was dominated over HCV. The trend of HBV infections were found to be 5 cases among Libyans, 6 among Sudanese, 4 among Egyptians, 4 among Syrians and 1 among Tunisian. The HCV infection was less prevalent. Only 1 case among Libyans and 3

Table 1. Types of infection and frequency of occurrence within the different age group of the tested population

Infections types	Age group intervals				
	1 st - 15-24 (66 individuals)	2 nd - 25 to 34 (135 individuals)	3 rd - 35 to 44 (45 individuals)	4 th - 45 to 54 (14 individuals)	5 th - 55 to 64 (68 individuals)
HBV	1	13	3	2	1
HCV	0	0	3	0	1
HIV	0	0	0	0	0

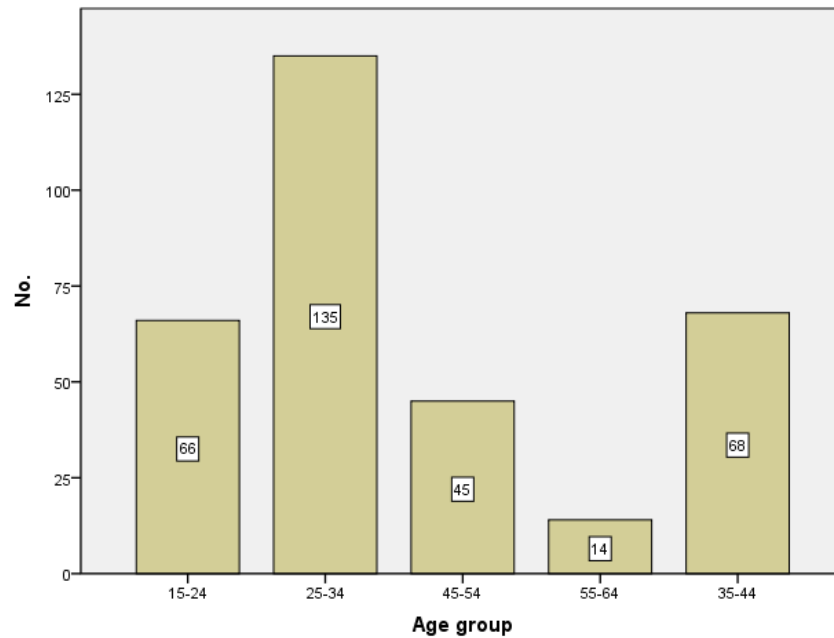


Fig. 1. Age intervals distribution of the study population

cases among Egyptians were detected; whereas, no HIV case was found over the period of the investigations. Moreover, almost all HBV and HCV infections were detected in 2015 and 2016, while only one case of HBV was detected in 2014 (Table 4)

Table 2. Infections types and percentage of infected individuals in the tested sample populations

Infection types	Number	%
Not infected	304	92.7
HBV	20	6.1
HCV	4	1.2
Total	328	100.0

4. DISCUSSION

The hepatitis viral infection has become great concern and life threatening in the developed and developing countries [12]. Based on the level of infections frequency, the concerned countries have been classified as low (<2% infections), intermediate (2-8% infections), and high endemic (>8% infections) country [16]. Mohamed et al. [17] put Libya within intermediate endemic class based on prevalence of HBV infections in entire Libya and placed Egypt in the higher level endemic class. Some report also suggested that the prevalence of HBV infection within Libyan was 2.2% [18]. Our present investigations

reported that the frequency of HBV infections was 6.1% among individuals who are undergoing pre-employment and premarital stage in Tobruk area. We also reported that the infections of HBV were found among different nationalities living in Tobruk city such as: Sudanese, Egyptian and Syrian. Some reports suggested that prevalence of HBV and HCV infections in Tunisia were about 5% [19]. Several earlier scientific investigations suggested that Sudan is one of the highly hepatitis endemic country in the world [20]. Libyan government have taken many preventive measures; such as obligatory vaccination to all newborn babies and compulsory blood screening of blood donors and pre-employment and premarital laboratory tests by expert scientist in an attempt to prevent these viral infections [21,22,23,24]. However, the occurrence of HCV infection is less frequent than HBV infection in the study sample; however, 1 Libyan and 3 Egyptians are identified as HCV positive. Our present investigations did not find out any HIV infections so far. The prevalence of HCV infection is historically high in Egypt. The use of parenteral anti Schistosomal therapy, multiple usages of glass syringes might have contributed to the HCV infections in various remote regions in Egypt [25]. Our observation finally confirmed that the number of HBV infections in individuals who performed premarital and preemployment checkup in Tobruk area in 2015-2016 were very high especially among male.

Table 3. The occurrence and types of hepatitis infections among different nationalities in the tested samples populations

Infection types	Nationality						Total
	Libyan	Sudanese	Egyptian	Indian	Syrian	Tunisian	
Not infected	73	40	153	14	21	3	304
HBV	5	6	4	0	4	1	20
HCV	1	0	3	0	0	0	4
Total	79	46	160	14	25	4	328

Table 4. Year wise infections frequency and their types in the tested sample population

Year of infections	Types of Infections and frequency			Not infected
	HIV	HBV	HCV	
2014	0	01	0	64
2015	0	10	02	200
2016	0	09	02	40

5. CONCLUSIONS

Tobruk is a small port city inhabited by multinational people over long period of times. The occurrences of hepatitis viral infections were studied among individuals who performed pre-employment and premarital blood analysis in Tobruk during the past three years (2014 to 2016). In addition to Libyan, a number of foreign nationals especially Egyptian, Sudanese, Syrian and Tunisian were found to be infected with these viral infections according to our investigation during pre-marital and pre-employment blood check up programme held in the Public and Family Health Clinic, Tobruk.

The incidences of major blood borne viral infections such as HBV, HCV have been noted in Tobruk city during research investigations of past three years (2014 to 2016). Our studies showed that incidence of Hepatitis B infections were more frequent i.e. 6.1% (20 cases of HBV infections detected out of 328 individuals) than Hepatitis C infections i.e. only 1.2% (4 cases of HCV infection were detected out of 328 individuals) and there was no case of HIV infection detected so far.

As hepatitis viral infection is not preventable by merely vaccination, we recommended larger and intensive research to develop a preventive strategy to prevent these viral infections. WHO also urges to take action to improve surveillance, prevention, access to screening and management at the regional levels.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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