



HEPATITIS B INFECTION IN EASTERN REGIONS OF BULGARIA

Tatiana T. Todorova¹, Gabriela Tsankova¹, Neli Lodozova²

1) Department of Preclinical and Clinical Sciences, Faculty of Pharmacy, Medical University Varna, Bulgaria

2) Medical College, Medical University Varna, Bulgaria

ABSTRACT

Background: Bulgaria is a country of moderate endemicity for hepatitis B infection with 3-7% of the general population chronically infected with the virus. Since 1991, an obligatory vaccination has been implemented for all healthy newborns. As a result, twenty years later, hepatitis B prevalence is significantly reduced but viral hepatitis still represent an important public health problem that needs to be addressed especially in some ethno-religious and regional groups.

Purpose: No recent published data are available about hepatitis B circulation in Bulgaria and in its Eastern part particularly. In the current study, we analyze the epidemiological data on hepatitis B cases in easternmost Bulgarian regions and try to determine the possible risk, which the infection poses to public health in these regions.

Material/Methods: We performed a retrospective analysis (2008-2014) using epidemiological data from the National surveillance system for hepatitis B notification.

Results: The incidence of acute hepatitis B in all considered regions has been durably decreasing for the last seven years: while in 2014 its total value was 9,69‰, in 2014 it reached a minimal rate of 3,09‰. We found that young individuals in their 20s years (the borderline generation before and after implementation of mandatory vaccination) are most vulnerable to hepatitis B. South regions are also more affected by hepatitis B infection when compared with regions on the North.

Conclusions: We reported a stable downward trend in the incidence of hepatitis B infection in all studied regions of Bulgaria. This result can be directly linked with the presence of effective vaccination program at national level.

Key words: Hepatitis B, incidence rates, epidemiology, eastern Bulgaria

INTRODUCTION

Viral hepatitis B is a common and devastating communicable disease. World Health Organization estimates that 2 billion of world population has encountered the infection during its life and 240 million are currently chronic carriers of hepatitis B virus (HBV) [1]. Frequency of HBV carriage in different countries ranges from low (< 2%), to average (2-8%) and high (> 8%) prevalence rates. Across the European region the number of people living with HBV reaches 14 million and the prevalence of chronic carriage generally increases from North to South and from West to East, varying between 0,1%

in Netherlands and >7% in Balkan countries [2].

HBV infection, despite its fatality, is currently preventable with an effective and safe vaccine. From 1989 to 1991, a selective immunization for babies born to HBsAg positive mothers was introduced in Bulgaria. Since 01.08.1991, the vaccination has taken part in the mandatory immunization schedule of the country – all healthy newborns receive the first vaccine dose within 24 hours of their birth. Vaccination is also recommended for adults in risk: health care workers, intravenous drug users, patients with multiple blood transfusions, transplantation, hemophilia, hemodialysis etc. Immediately after the 3-year period of selective immunization (1989-1991), a 82% decrease in HBV morbidity in children was observed [3]. Due to immunization, as well as overall improvement in preventive measures, Bulgaria has changed its status from high endemic area (with annual incidence rates of approx. 25-35‰ in 80s)[3] to moderate endemic area (with only 302 reported cases and annual incidence rate of 4,1‰ in 2013) [4].

Despite the existent and successful vaccination policy, hepatitis B infection is still an important public health problem in Bulgaria that needs to be addressed especially in some ethno-religious and regional groups. No recent published data are available about HBV circulation in Bulgaria and in its Eastern part particularly. Therefore, we try with the current study to analyze the epidemiological data on HBV cases in several regions in Eastern Bulgaria and to find out the possible risk, which HBV infection poses to public health in these regions.

MATERIALS AND METHODS

We chose to analyze HBV epidemiological patterns in the easternmost Bulgarian regions – Dobrich, Shumen, Varna (located in the Northeast) and Burgas and Yambol (in the Southeast). Burgas, Dobrich and Varna cover the Bulgarian coastline of Black sea and receive most of the tourists visiting the country. Burgas and Yambol bound on the south Turkey and experience the outcome of enlarged migrant's flow during the last two years.

The corresponding Regional Health Inspections kindly provided the compulsory notification data on registered HBV cases for 7-years period (2008-2014). These data represent the official epidemiological information about the cumulative HBV incidence rate (determined according EC 2002 case definition for the first three years of the analysis – 2008, 2009 and 2010 and according extended EC 2008 case definition for the rest of the period).

RESULTS AND DISCUSSION

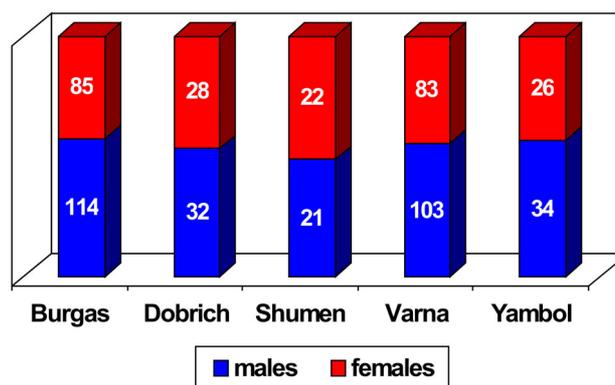
During the last seven years (2008-2014), a total of 548 newly infected individuals was registered in Burgas, Dobrich, Shumen, Varna and Yambol Regions of Bulgaria – 199, 60, 43, 186 and 60 cases respectively (Table 1). Despite the insignificant statistical difference in some of the studied regions (Dobrich and Shumen), the incidence rate of HBV showed approximately 3-fold decrease– the general incidence for all five regions was 9,69‰000 in 2008 and 3,09‰000 in 2014.

In general, southeastern regions (Burgas and Yambol) showed higher average incidence of HBV (6,84‰000 and 6,52‰000) compared with the regions on the North –Varna, Dobrich and Shumen which had an average incidence of 5,59‰000, 4,52‰000 and 3,40‰000 respectively. The average incidence for the whole period on South was 1,48 higher than the incidence on North ($p < 0,05$). This result suggests that the pattern of HBV epidemiology at national level generally follows the European distribution with highest rate in southeastern areas. Additional explanation could be found in the accelerated migration towards south regions during the last years.

HBV infection affects all age groups (Table 2), but the incidence rate is highest in individuals of 20-29 years (197 cases in total). The observed higher risk of HBV transmission in young people can be explained with increased risky behavior, such as drug injection abuse, tattooing and piercing or unsafe sexual contacts. Lack of vaccination can serve as an additional explanation – people in their 20s in 2008-2014 are in fact the borderline generation before and after implementation of mandatory anti-HBV vaccine. Similar results were obtained in Poland and in Arkhangelsk region, Russian Federation, where adolescent and young patients (15-29 years) were found to be the most affected by HBV infection [5, 6]. Most of the authors working in the field [5, 7, 8] find the lowest incidence in the age 0-19 years. In our study, also the lowest number of cases was registered under age of 9 years (16 cases in total). Partial explanation can be found in the fact that HBV infection in small children is usually

asymptomatic and hardly diagnosed [7], but this small number of cases shows undoubtedly the effectiveness of anti-HBV vaccination. To optimize its impact, especially in adolescents and to reduce the risk for 20-years-old young adults, an additional immunization at age of 12 years could be considered [9].

During the examined period, male cases (304) dominated over female cases (244) (Fig. 1) – standard trend, found in most of the HBV epidemiological studies [10] and explained with higher number of sexual contacts, tattooing and drug abuse in men (especially in 20-29-year-old men). However, one of the studied regions showed a different pattern: in Region Shumen HBV infection affected equally males and females. The observed male dominance was of insignificant statistical importance ($p > 0,05$).



CONCLUSIONS

In this study we show that during 2008-2014, HBV infection tends to decrease in the examined regions (Burgas, Dobrich, Shumen, Varna and Yambol). This fact is a logical consequence from the mandatory vaccination but is also a result from improvement in hygienic conditions, implementation of single-use medical devices and better control of blood products in Bulgaria.

Table 1. General distribution of HBV cases in the studied regions

	Burgas		Varna		Dobrich		Yambol		Shumen		Total	
	No	Inc.*	No	Inc.*	No	Inc.*	No	Inc.*	No	Inc.*	No	Inc.*
2008	39	9,38	52	10,95	14	7,38	19	14,45	11	6,09	135	9,69
2009	36	8,66	43	9,05	15	7,91	10	7,61	7	3,88	111	7,97
2010	27	6,49	24	5,05	7	3,69	5	3,80	5	2,77	68	4,88
2011	25	6,01	20	4,21	6	3,16	4	3,04	5	2,77	60	4,31
2012	30	7,21	17	3,58	6	3,16	9	6,85	4	2,22	66	4,74
2013	27	6,49	17	3,58	6	3,16	8	6,09	7	3,88	65	4,67
2014	15	3,62	13	2,74	6	3,16	5	3,80	4	2,22	43	3,09
Total	199		186		60		60		43		548	
p [#]	0,04		<0,001		0,07		0,005		0,4		<0,001	

No – number of registered cases

*Incidence rates (Inc.) were calculated using the official data for total population number according 2011 census (Burgas – 414184; Varna – 473804; Dobrich – 182808; Yambol – 125724; Shumen – 176925)

[#]p-value was calculated for the corresponding trend using Chi-square test calculator (<http://quantpsy.org>).

Table 2. Age distribution of HBV cases in the studied regions

Age	Burgas	Varna	Dobrich	Yambol	Shumen	Total
0-9	6	5	1	4	0	16
10-19	28	15	8	12	7	70
20-29	66	71	18	24	18	197
30-39	38	31	13	8	9	99
40-49	23	28	10	5	4	70
50-59	18	22	6	5	1	52
60+	20	14	4	2	4	44
Total	199	186	60	60	43	548

*p-value was < 0,001 for all regions and was calculated for the corresponding trend using Chi-square test calculator (<http://quantpsy.org>).

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Address for correspondence:

Tatina T. Todorova
Department of Preclinical and Clinical Sciences, Faculty of Pharmacy, Medical University Varna
55, Marin Drinov Str., 9002 Varna, Bulgaria
E-mail: tatina.todorova@abv.bg