



Epidemiology of hepatitis B virus infection in Albania

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years) and 29.7% in voluntary blood donors (mean age: 40.1 years). There were no significant differences between males and females.

CONCLUSION: Despite the estimated two-fold reduction of HBsAg prevalence in the general population from about 18%-19% to 9.5%, Albania remains a highly endemic country (i.e. over 8% of HBsAg prevalence rate).

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Key words: Albania; Hepatitis B virus; Blood donor; Military; Pregnant women; Schoolchildren; Student

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Abstract

AIM: To assess the prevalence and socio-demographic distribution of hepatitis B virus (HBV) infection in Albania.

METHODS: Blood samples from 410 unselected schoolboys, 666 students, 500 military personnel, 1286 casual blood donors, 378 voluntary blood donors and 640 pregnant women (total 3880 non-vaccinated residents of rural and metropolitan areas from all over Albania; 2354 (60.7%) male and 1526 (39.3%) female; mean age of 26.3 years) were tested during 2004-2006 for hepatitis B surface antigen (HBsAg) and antibodies to hepatitis B virus (anti-HBs) by ELISA.

RESULTS: The HBsAg and anti-HBs prevalence were 9.5% and 28.7%, respectively. The highest HBsAg prevalence was evident in the younger age group, such as in schoolchildren (11.8%) and the military (10.6%). Consequently, the anti-HBs prevalence increased with age, from 21.2% in schoolchildren (mean age: 15.7 years), to 36.3% in pregnant women (mean age: 26.3

INTRODUCTION

Hepatitis B is a disease of global distribution. It is estimated that about 30% of the world's population, i.e. approximately 2 billion people, show serological evidence of hepatitis B virus (HBV) infection and about 40 million are persistent carriers of HBV^[1]. Each year over one million people die from HBV-related chronic liver disease, including cirrhosis and hepatocellular carcinoma^[2].

The endemicity of HBV infection varies greatly worldwide and is influenced primarily by the age at which infection occurs^[3,4]. In Europe, the level of endemicity increases from north to south and from west to east. Most countries of northern and western Europe have a very low prevalence of HBV infection (less than 0.5% of the population being positive for HBsAg). Unexpectedly high prevalence of hepatitis B carriage (5%-12%) have been found in many parts of central and Eastern Europe and the former Soviet Union countries^[5,6]. Endemicity of infection is considered high in those parts of the world where at least 8% of the population is HBsAg positive. Almost all infections

occur either during the prenatal period or early in a childhood, which accounts for the high rates of chronic HBV infection in these populations^[7].

Credible epidemiological data of HBV infection in Albania, before the introduction of obligatory vaccination of newborn children against HBV (1995), was obtained by screening Albanian refugees during the first mass scale migration from Albania to Italy and Greece that occurred in 1991^[8-10]. Although the refugees represented mostly subjects from lower socio-economic classes, the large number of people enrolled from different geographic areas (rural and urban) provided important information on HBV infection in Albania (Table 1). The presence of one or more serological markers of HBV infection and the high rate of infection in children aged 1 to 10 years confirms the endemic nature of this virus in Albania.

The above-mentioned data of HBV infection in Albania were undoubtedly related to low hygiene and poor economic situation, overcrowded conditions, lack of disposable needles and syringes, lack of safe blood and its products for transfusion, inadequate sterilization of reusable equipment, difficulties in obtaining appropriate personal equipment to prevent exposure to blood, and lack of an immunization program against HBV.

In 1992, WHO recommended that all countries should include hepatitis B vaccine in their routine infant immunization programs. Since May 1995, thanks to the Rotary International Club, Albania introduced vaccination of newborn children against HBV into the National Immunization Programs as the most appropriate immunization strategy to reduce the rate of HBV infection and HBV-related chronic liver diseases. Infants are immunized at birth, and then after 1 and 5 mo.

MATERIALS AND METHODS

Blood samples from 3880 randomly selected non-vaccinated residents of rural and urban areas from all over Albania were tested during 2004-2006 for HBsAg and anti-HBs by ELISA. The blood samples were obtained from 2354 (60.7%) males and 1526 (39.3%) females (mean age of 26.3 years) comprising 410 schoolchildren, 666 students, 500 military, 1286 casual blood donors, 378 voluntary blood donors and 640 pregnant women. Casual blood donors included individuals who donated blood only once, whereas voluntary blood donors included regular blood donors (Table 2). We took blood samples randomly from schoolchildren from several high schools, students from the University of Tirana and soldiers from several military units in main districts of Albania. We also collected blood samples from all casual blood donors and voluntary blood donors during 2004-2005 at the Blood Bank Centre of Tirana. The origin of the subjects was approximately equally distributed between rural and urban regions (1834 rural, 1846 urban).

RESULTS

Baseline characteristics of the study population are presented in Table 2.

Table 1 Prevalence of hepatitis B markers in Albanian refugees according to studies in Italy and Greece

Author	Sanantonio <i>et al</i>	Dalekos <i>et al</i>	Malamitsi- Puchner <i>et al</i>
Study region	Bari	Ioannina	Athens
Yr	1993	1995	1996
Ages	Adults	All ages	Pregnant women
No. cases	393	1025	500
% prevalence of HBsAg	19	22.2	13.4
% prevalence of anti-HBs	55	52	53

Table 2 Baseline characteristics of the study groups

Study groups	Characteristics			
	No (%)	M/F (%)	Mean age (yr)	Yr
Schoolchildren	410 (10.6)	264 (64.4)/ 146 (35.6)	15.7 ± 1.2	2004
Students	666 (17.2)	340 (51.1)/ 326 (48.9)	23.1 ± 1.7	2005
Military	500 (12.9)	500 (100)/ 0 (0)	19.2 ± 2.3	2005
Casual blood donors	1286 (33.1)	987 (76.6)/ 299 (23.3)	32.4 ± 4.8	2004
Voluntary blood donors	378 (9.7)	263 (69.6)/ 115 (30.3)	40.1 ± 5.1	2005
Pregnant women	640 (16.5)	0 (0)/ 640 (100)	27.4 ± 4.9	2006
Total	3880	2354 (60.7)/ 1526 (39.3)	26.3 ± 6.2	2004-2006

Table 3 HBsAg and anti-HBs prevalence in different study groups

Study groups	No. cases	Prevalence (%)	
		HBsAg-positive	antiHBs-positive
Schoolchildren	410	48 (11.8)	87 (21.2)
Students	666	58 (8.7)	247 (37.2)
Military	500	54 (10.6)	124 (24.7)
Casual blood donors	1286	115 (8.9)	293 (22.8)
Voluntary blood donors	378	36 (9.6)	112 (29.7)
Pregnant women	640	47 (7.3)	232 (36.3)
Total	3880	358 (9.5)	1095 (28.7)

The HBsAg and anti-HBs prevalence was 9.5% and 28.7%, respectively. The highest HBsAg prevalence rate was evident in the younger age groups, such as in schoolchildren (11.8%) and in military personnel (10.6%). Consequently, the anti-HBs prevalence increased with age, from 21.2% in schoolchildren (mean age: 15.7 years), to 37.2% in students (mean age: 23.1 years), to 36.3% in pregnant women (mean age: 26.3 years) and 29.7% in voluntary blood donors (mean age: 40.1 years). There were no significant differences between males and females (Table 3). With regard to the age groups, we found prevalence of HBsAg was: 16-20 years: 11.8%; 21-25 years: 9.2%; 26-30 years: 8.3%; 31-35 years: 8.9%; 36-40 years: 9.5%; 41-45 years: 9.5%. We found higher prevalence of HBsAg positivity in urban inhabitants compared with rural inhabitants (11.8% and 7.6%, respectively).

DISCUSSION

The data of this study showed an evident reduction of HBsAg in the general non-vaccinated population of Albania, from 18%-19% (before 1995) to 9.5%. Similar HBsAg prevalence rates were noted among pregnant Albanian women delivering in Greece, and in Albanian health care workers (9.8% and 8.1%, respectively)^[11,12].

The success of routine immunization of children and adolescents in interrupting HBV transmission has been previously demonstrated in several high- and low-endemic areas^[7]. A primary indicator of the positive impact of hepatitis B vaccination is a reduction of the seroprevalence of HBsAg in the vaccinated population^[13]. HBsAg carrier rate in the vaccinated groups has decreased by as much as 74% in less than 10 years in Italy, 96% in 7 years in Saudi Arabia, 93% in 15 years in Taiwan, 79% in 10 years in Thailand, and almost 100% in Alaska^[14-18]. Apart from the decreasing seroprevalence of HBsAg in vaccinated populations, another indicator is the decline in the number of acute cases of hepatitis B. Although infections in pediatric age groups are not easy to demonstrate because hepatitis B is rarely symptomatic, trends in the incidence of acute hepatitis B disease can be used to evaluate the influence of vaccination programs in adolescents and adults who are most likely to have asymptomatic infections after HBV exposure^[19,13]. In countries such as Italy and the United States, the incidence of acute hepatitis B has declined dramatically during the last decade, particularly among young age groups^[20,21]. A significant decline of annual frequency of acute viral hepatitis B from 692 new cases in 2000, to 348 in 2005 was also noted in Albania^[22].

Taking into consideration: (1) the reinforcement of the general preventive measures, such as the implementation of the safe injection procedures, proper sterilization of the medical and dental equipment, proper screening of the blood and its products, and progress in health education; and (2) vaccination of some high-risk groups (health care workers, hemodialysis and thalassemic patients), the significant reduction of HBV markers among the non-vaccinated general population (9.5%) compared to the previous rate of 1993-1995 (18%-19%), may be attributed to the 12 consecutive years of vaccination of newborn children against HBV. Similar decreases in HBsAg carrier rates in the non-vaccinated population were also observed in Saudi Arabia and Taiwan^[23,24].

The main cause of the reduction in HBsAg prevalence in the general non-vaccinated population (after infant vaccination against HBV) is based on the effective prevention of perinatally transmitted HBV infections among children of HBsAg-positive mothers, and prevention of early childhood transmission between household contacts, which are thought to be responsible for a significant number of HBV infections^[18,25-29]. Even in regions with low endemicity, transmission of infection between children and transmission from infected infants to adults has been well documented. This risk of transmission is also demonstrated by the higher infection

rate in refugee families and in children's institutions^[26]. Furthermore, chronically infected children are likely to be HBeAg positive with a high infectious potential for transmission to other children or adults. Thus, we hypothesize that vaccination programs decrease the risk of HBV infection not only for vaccinated children, but also for all of the population, even those who are non-vaccinated.

COMMENTS

Background

Hepatitis B is a disease of a global distribution. The epidemiological situation of hepatitis B virus (HBV) infection in Albania before the introduction of obligatory vaccination on newborn children against HBV in 1995 was very grave, with high prevalence rates of HBsAg in general population.

Research frontiers

Despite the estimable two-fold reduction of HBsAg prevalence in general population from about 18%-19% to 9.5%, Albania remains a high endemic country.

Innovations and breakthroughs

The vaccination program of newborn children against HBV infection has beneficial effects in the decrease of HBsAg prevalence in non vaccinated population.

Peer review

It is in general well written, organized and interesting.

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