Screening for hepatitis B virus and accelerated vaccination schedule in prison: A pilot multicenter study

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BACKGROUND AND AIM

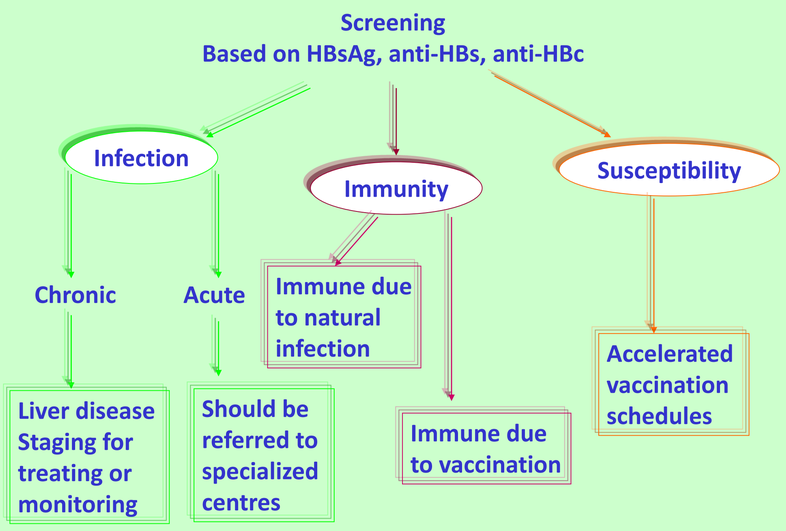
The hepatitis B virus (HBV) vaccine, available since 1982, has shown high efficacy in the prevention of HBV infection (95%), as well as in the prevention of chronic liver disease, cirrhosis, and HBV-related hepatocellular carcinoma [Chang et al., 2015]. According to data published by the European Centre for Disease Prevention and Control (ECDC), the prevalence of HBV in the European Union and countries of the European economic area is 0.9% [ECDC, 2016].

Inmates represent a population at high risk for HBV infection due to the numerous social and environmental problems that affect them – in particular, the use of intravenous drugs, unprotected sexual behaviour, execution of tattoos using non-sterile needles, in addition to specific characteristics of prison environment, such as limited space and overcrowding. Several studies show that HBV infection in inmates has ranged from 1.4% to 23.5% [Dolan et al., 2016]. The highest prevalence of HBsAg is found in detainees in West and Central Africa (23.5%). High levels of chronic HBV infection have also been reported in Eastern and Southern Africa (5.7%), and in Eastern Europe and Central Asia (10.4%).

The aims of this study were to (1) increase the epidemiological knowledge on the impact of HBV in Tuscany region prisons by registering the results of serum screening on a clinical medical record and (2) increase the anti-HBV vaccination using an accelerated schedule.

METHODS

SCREENING FOR HBV INFECTION. This was a prospective study with evaluation of serum markers of HBV and a subsequent vaccination in non-immune subjects. The screening for serological markers of HBV (HBsAg, anti-HBs, anti-HBc) will distinguish between infection, immunity and susceptibility to infection [Stasi et al., 2017].



The **inclusion criteria** were as follows: all detained "new prisoners" from freedom or from other institutes that have not performed markers for HBV (HBsAg, anti-HBs, anti-HBc) in the previous 3 months and who remained in the facility for a period of at least 10 days; all detainees already present in the penitentiary structures of Tuscany at 24 October 31, 2016 who were not evaluated for HBV markers in the previous 3 months. 15 detention facilities out of the 17 present in Tuscany were enrolled in the study.

VACCINATION ANTI-HBV INFECTION. The vaccination programs were conducted in all HBsAg– and anti-HBs– subjects. In case of anti-HBc+ and HBsAg– and anti-HBs– antibodies, the IgM antibodies have been performed: if IgM and HBsAg–and anti-HBs– (anti-HBc isolated) it was necessary to evaluate the HBeAg and anti-HBe markers and detect the viremia (HBV-DNA). In case of markers' positivity, vaccination was not indicated. We have excluded by vaccination the following people: Italians born after 1991; anti-HBs positive subjects regardless of the antibody titre except for immunocompromised (e.g. patients undergoing haemodialysis, HIV-positive subjects) with anti-HBs antibody values <10 IU/L. The population aged <18 years has followed the regional scheme for anti-HBV vaccination and therefore was excluded by accelerated programs. The vaccine utilised was Engerix B (20 µg/1 ml) in subjects ≥18 years. The vaccine was administered in the left arm's deltoid muscle at time 0, 7, 21 days and after 12 months; after vaccination, a certification of vaccination was issued. We reported only the percentage of three doses.

The demographic data of the study were appropriately encrypted in the database and the exported file (containing the "anonymized" data) was sent from the system to the Regional Health Agency of Tuscany via a secure channel.

RESULTS

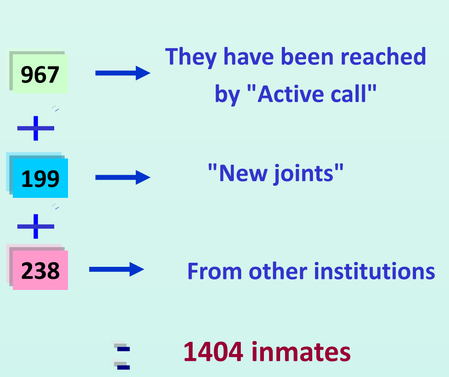


Figure 1. Total subjects potentially to be screened

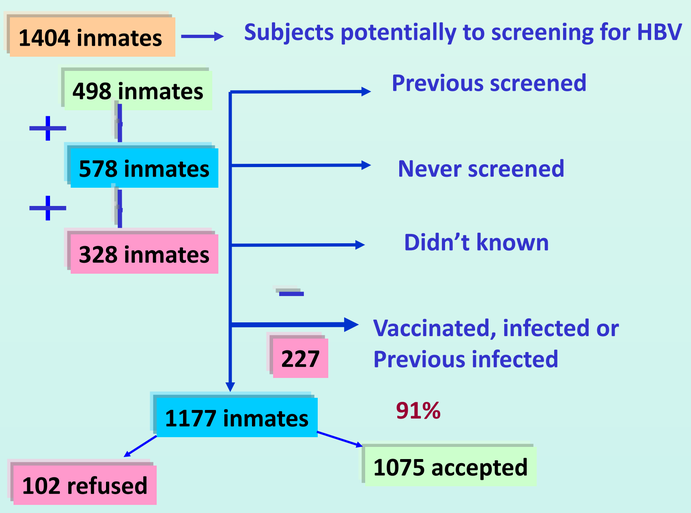


Figure 2. Study population who underwent screening

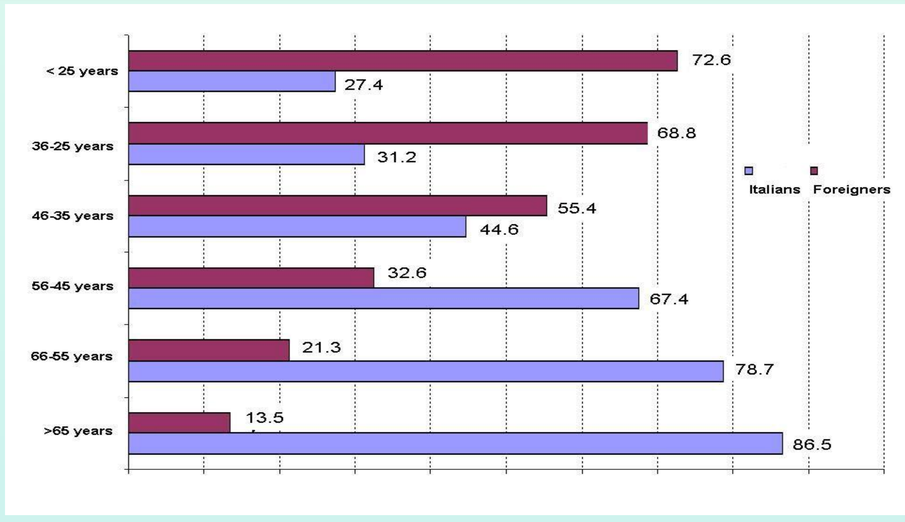


Figure 3. Distribution by classe of age of Italians and foreigners of the study population

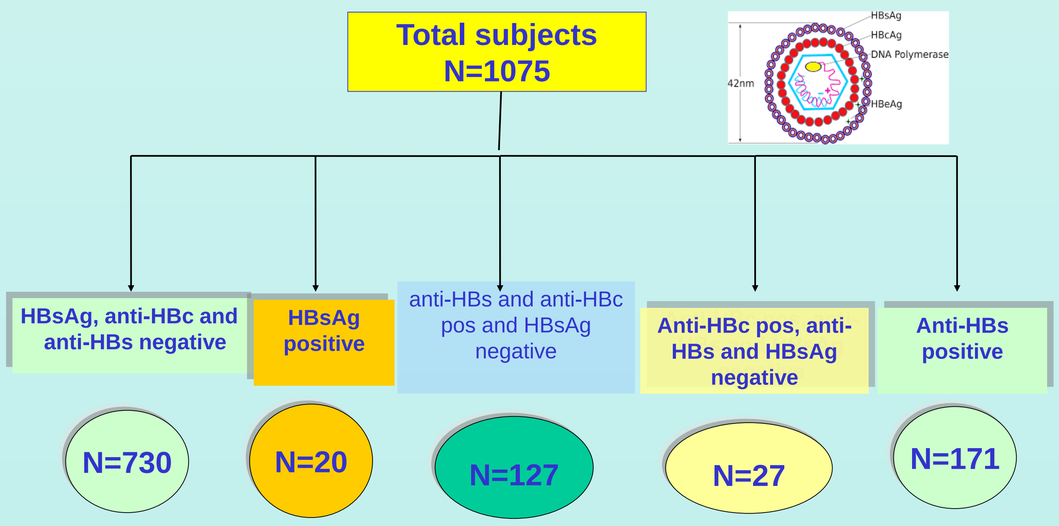
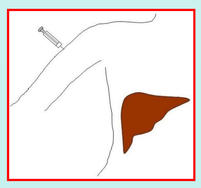


Figure 4. Data of medical record of vaccinated, infected or previous hepatitis B-infected subjects



Acceptance of vaccination	First dose (Time 0)		Second dose (Time 7 days)		Third dose (Time 21 days)	
	N	%	N	%	N	%
Yes	555	95.1	508	94.2	404	82.6
NO – Transferred	2	0.3	1	0.2	3	0.6
NO – Released	26	4.3	17	3.2	66	13.5
NO – Reject	1	0.2	3	0.6	4	0.8
NO – Other	17	2.8	10	1.9	12	2.5
Total	601	100	539	100	489	100

Table 1. Description (N,%) of the vaccination schedule for inmates susceptible to vaccination, based on recorded data

CONCLUSIONS

- The results of our study confirm very high levels of coverage, taking into account both the entire enrolled population and the new prisoners.
- The high prevalence of third-dose subjects indicates that accelerated vaccination may be a useful choice for ensuring short-term protection in most people.
- Further studies will be able to demonstrate the serum protection reached after the end of the vaccination schedule.

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