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The Role of Mass Serological Screening in Evaluating Strategies for Combating Parenteral Viral Hepatitis and HIV in Morocco: A Study Conducted at the Mohammed V Military Teaching Hospital in Rabat

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Abstract

This descriptive cross-sectional study was conducted in 2024 at the Rabat Military Hospital with 5,235 (4,063 men, 1,172 women) applying for compulsory military service. Murex ELISA tests were used on an ETI-max3000 automated system. The serological markers sought were: HBsAg (HBV), core antigen and anti-HCV antibodies (HCV), anti-HIV1+2 antibodies, and p24 antigen.

Two cases of HIV were identified (prevalence of 0.038%). However, no cases of HBV or HCV were detected. These results reflect an overall reassuring situation, but call for continued vigilance, particularly in relation to migration flows. The low prevalence observed confirms the importance of early detection, targeted prevention, and awareness campaigns among young people. This study aligns with the objectives of the 2023-2030 National Plan to eliminate HIV and hepatitis as public health threats in Morocco by 2030.

Introduction

Mass serological screening is a public health strategy that involves systematically testing a targeted population to identify the presence of chronic infections such as hepatitis B (HBV), hepatitis C (HCV), human immunodeficiency virus (HIV), and syphilis. This approach aims to detect infected individuals early, thereby facilitating their care and helping to limit the transmission of these viruses within the community.

In Morocco, these infections represent a major public health problem. The latest national estimates, in 2019, indicate a prevalence of around 0.7% for HBV and 0.5% for HCV in the general population, rates which rise to around 1% in people over 40 years of age [1].

Globally, the burden of these infections remains a serious concern. According to World Health Organization (WHO) studies, approximately 254 million people were living with chronic HBV infection in 2022, and 50 million with HCV. These diseases are responsible for more than 3,500 deaths every day worldwide, making viral hepatitis the second leading cause of infectious mortality globally [2]. HIV also remains a global threat, although progress has been made. In 2023, 1.3 million new HIV infections were recorded worldwide, and approximately 630,000 people died from the infection [3].

In this context, the implementation of mass serological screening among young people in Morocco is a crucial lever for improving detection, limiting the spread of these infections, reducing their long-term health impact, and, above all, contributing to the national plan for the eradication of viral hepatitis by 2030. The objective of this study is to describe the epidemiological and serological data of a young Moroccan population that underwent mass serological screening in 2024, as part of their mandatory military service, at the HMIMV virology laboratory.

Patients and Methods

This study is a cross-sectional prevalence survey designed to estimate the frequency of hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV) infections in a young population in Morocco in 2024. The target population consisted of young Moroccans aged 18 to 25 years, called up for mandatory military service. Participants underwent a medical fitness examination, including a blood sample for screening for chronic viral infections. These samples were collected at the virology laboratory of the HMIMV (High Medical Institute of Morocco). The samples were first centrifuged at 4,000 rpm for 20 minutes. The sera were then aliquoted into labeled sterile cryotubes and stored in a serum bank for temporary temperature-controlled storage prior to analysis.

Serological analysis was performed using an Etimax3000 automated system using Murex HBsAg, HCV Ag/Ab and HIV Ag/Ab kits [4, 5, 6]. This automated system performs ELISA-type immuno-enzymatic tests on 96-well plates, enabling the detection of serum markers of the three viruses.

Results

The study population consisted of 5,235 young Moroccans aged 18 to 25 who underwent mass serological screening for HBV and HCV and HIV as part of their mandatory military service. There was a clear male predominance in the study population. Of the 5,235 participants, 4,063 (77.6%) were men compared to 1,172 (22.4%) women. The graph highlights a strong predominance of the regions of Rabat-Salé-Kénitra (25.6%), Casablanca-Settat (23.2%), and Tangier-Tetouan-Al Hoceima (19.5%), which together account for nearly 70% of the total analyzed. Of the 5,235 participants screened, 2 cases of HIV seropositivity were detected. No positive cases were identified for the hepatitis B virus (HBV) or the hepatitis C virus (HCV).

Discussion

HIV

In our study, 2 HIV-positive cases were detected among the 5,235 participants, corresponding to a prevalence of 0.038%. While this figure warrants particular attention, it remains significantly lower than the global seroprevalence, estimated at around 1.2% [4], and well below the rates observed in sub-Saharan Africa, where it reaches nearly 9% [7], with countries like South Africa sometimes ex-

ceeding 20% [7].

In Morocco, the overall prevalence is estimated at approximately 0.06%, based on the latest official data indicating nearly 23,000 people living with HIV in a total population of approximately 37 million [8]. Thus, although two cases were identified in our sample, the observed prevalence remains modest compared to national, regional, and international rates.

However, this situation could change in the current context of Morocco's increasing openness to several African countries, particularly those in sub-Saharan Africa, where the virus remains actively circulating. The growth of tourism, economic, and academic exchanges increases the risk of imported cases and silent transmission of HIV. It is therefore essential to strengthen targeted screening, medical monitoring, and awareness campaigns, especially among travelers, students, and mobile populations. A reinforced and destigmatized prevention strategy is crucial to anticipate the evolution of the epidemiological situation.

Compulsory military service, as a large-scale national operation, plays a central role in this system. It allows for systematic screening of recruits upon enlistment, facilitating the early detection of infections and rapid referral for treatment. This program, which also aims to strengthen the social integration, discipline, and civic engagement of young people, represents a strategic public health opportunity by integrating prevention, awareness, and individual responsibility. It thus actively contributes to the fight against the spread of HIV and other communicable diseases.

HBV

In our study of 5,235 samples taken from young people aged 18 to 25 years, candidates for compulsory military service, no cases of positivity for hepatitis B surface antigen (HBsAg) were detected. This result can be attributed, at least in part, to the impact of the National Immunization Program (NIP), which has included routine HBV vaccination for several years. The HBV vaccine was introduced into the Moroccan NIP in 1999, with an initial three-dose schedule (at 2, 4, and 6 months), and then reinforced in 2014 by the addition of a dose at birth, in accordance with WHO recommendations.

Despite the implementation of a structured vaccination program, some limitations remain on the ground. One of the main difficulties lies in the failure to adhere to booster vaccination schedules, which are often neglected by parents. This irregularity can compromise the complete immunization of children, exposing some individuals to the risk of subsequent infection. To address this, it would be beneficial to offer a supplementary vaccination schedule for adults, particularly young adults whose vaccination status is uncertain or incomplete, in order to ensure better individual and collective protection against the virus.

Furthermore, the national screening protocol is currently limited to the detection of HBsAg, which does not allow for the identification of occult forms of the infection. These forms can be present despite a negative HBsAg result and are only revealed through the detection of anti-HBc antibodies, with or without anti-HBs. This type of silent infection constitutes a potential risk of transmission. The 2024–2030 National Strategic Plan also emphasizes that HBV screening remains incomplete in the general population, which reinforces the need to integrate the detection of anti-HBc and anti-HBs antibodies into screening protocols in Morocco, as recommended by this study [9].

HCV

In our study, no cases of hepatitis C (HCV) were detected. This result reinforces the hypothesis of a progressive reduction in the prevalence of this infection in the young Moroccan population. This favorable trend can be attributed to several factors. First, screening has become more accessible, earlier, and more frequent, thanks to the expansion of public and private medical testing laboratories throughout the country. Second, the therapeutic management of HCV has seen major advances with the introduction of direct-acting antivirals (DAAs). In Morocco, sofosbuvir (Sovaldi®) is used in combination with daclatasvir in a single oral regimen administered over a short period of 12 weeks. This treatment is well tolerated, with few side effects, and is effective for all genotypes. Another therapeutic combination, based on Sofosbuvir and Velpatasvir, is also available and offers equivalent efficacy, with the same ease of administration.

These therapeutic advances are part of an ambi-

tious national strategy (strategic plan 2024–2030) that aims to eliminate HCV in Morocco by 2030 [9]. The absence of detected cases in our target population could therefore reflect the combined effects of expanded screening, effective treatment, and improved coverage of at-risk populations.

Conclusion

These results confirm the importance and effectiveness of early and widespread serological screening in the fight against chronic viral infections. The systematic nature of this screening, integrated into a national program such as military service, not only allows for the identification of silent cases but also enables rapid intervention to prevent complications and curb transmission. The detection of two HIV cases in a young population at low apparent risk underscores that, despite a national prevalence estimated at only 0.06%, vigilance remains essential [8]. According to the AIDS 2024 national report, Morocco recorded a 60% reduction in the annual HIV incidence rate between 2010 and 2023 [8]. This encouraging trend demonstrates the impact of public policies, including free antiretroviral treatment, strengthened screening, and improved access to care for key populations.

In the case of HBV, the absence of seropositivity may reflect the positive effects of childhood vaccination, implemented under the National Immunization Program since 1999 and reinforced by the addition of a dose at birth in 2014 [1]. Regarding HCV, access to direct-acting antivirals (DAAs), now available in the Moroccan healthcare system, has contributed to a marked improvement in care, in line with national strategic guidelines [9].

It must be emphasized, however, that these results cannot be generalized to the entire Moroccan population, as the studied population was young, asymptomatic, and selected within a specific context. Nevertheless, they constitute a valuable indicator of the current situation among young adults and call for the repetition of such screening campaigns in different contexts and age groups to improve coverage and early detection.

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