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Seroprevalence of Infectious Markers in Blood Donors at the Blood Transfusion Center of the Moulay El Hassan Military Hospital in Guelmim

Dr. Yassine Khayar[1;2*]; Ennaffah L[2]; K L Kassimi I[3]; Malki H[1]; El Mrimar N[4]; Belmekki A[2]

[1]Central Laboratory of Medical Analysis, Moulay El Hassan Military Hospital, Guelmim, Morocco
[2]Blood Transfusion Center, Mohammed V Military Training Hospital, Rabat, Morocco
[3]Internal Medicine Department, Moulay El Hassan Military Hospital, Guelmim, Morocco
[4]Hematology Laboratory, University Hospital Center, Agadir, Morocco

Corresponding Author: Dr. Yassine Khayar[1;2*]

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Abstract: This retrospective study analyzes the seroprevalence of infectious markers (HIV, HCV, HBV, and syphilis) in blood donors at the Moulay El Hassan Military Hospital Blood Transfusion Center in Guelmim over a 4-year period (December 2020 - November 2024). 3884 donations were analyzed, revealing a prevalence of 0.28% for HBsAg, 3.07% for total anti-HBc antibodies, 0.21% for HCV antibodies, 0.03% for HIV, and 0.62% for syphilis. These results are compared to data from other studies conducted in Morocco and other regions, highlighting trends and challenges in transfusion safety.

Keywords: *Seroprevalence, Infectious Markers, Blood Donors, Transfusion Safety.*

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I. INTRODUCTION

Transfusion safety remains a major issue, ensuring the compatibility and safety of labile and stable blood products administered to patients, which must, of course, be free of transmissible infectious agents. Infection with the hepatitis B virus (HBV), hepatitis C virus (HCV), human immunodeficiency virus (HIV), and syphilis represent major public health problems. Systematic screening for these infectious agents is not only standard medical practice but also a legal obligation in many countries, including Morocco.

In Morocco, several studies have assessed the prevalence of these infections in blood donors, revealing geographical and temporal variations [1, 2, 3]. The Moulay El Hassan Military Hospital Blood Transfusion Center in Guelmim, operational since November 2020, plays a vital role in supplying blood products to the region. Continuous monitoring of the prevalence of infectious markers in blood donors at this center is essential to assess the effectiveness of transfusion safety measures and adapt prevention strategies.

- *Objective:*

This study aims to determine the seroprevalence of infectious markers (HIV, HCV, HBV, and syphilis) in blood donors at the Moulay El Hassan Military Hospital Blood Transfusion Center in Guelmim to contribute to the assessment of transfusion safety in this region.

II. PATIENTS AND METHODS

This is a retrospective study conducted at the Moulay El Hassan Military Hospital Blood Transfusion Center in Guelmim over a 3-year period (December 2020 to November 2023).

All donors underwent a pre-donation consultation including a clinical evaluation with measurement of vital signs. Two blood samples were collected from each donor. The first was used for

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blood grouping and complete blood count. The second was used for the detection of irregular agglutinins and the following infectious markers by microparticle chemiluminescence on an Abbott Architect automated analyzer: HIV (AgP24, anti-HIV 1 and 2 antibodies), HCV (anti-HCV 1 and 2 antibodies), HBV (HBs antigen, anti-HBs antibodies and total anti-HBc antibodies IgM+IgG) and Syphilis with TPHA and VDRL titration.

In case of a positive result, a second sample was taken for confirmation. Confirmation of positive HIV serologies was performed by Western blot (Bio-Rad®). For positive HBV serologies, a viral load was performed by real-time PCR on GeneXpert.

While maintaining anonymity, donors with positive markers were informed of their results and were managed in the hospital's internal medicine and infectious diseases department.

Blood donations were made in quadruple blood bags with leukocyte depletion filters. After a period of 6 to 18 hours, the blood donations underwent preparation and separation to produce labile blood products (red blood cell concentrates, platelet concentrates, and fresh frozen plasma).

III. RESULTS

A total of 3884 blood donors were included in the study, with a male predominance (3629 men versus 255 women). The average age of donors was 25.5 years. Serological screening revealed 177 samples positive for at least one infectious marker, for an overall prevalence of 4.56%.

The prevalence of infectious markers is reported in Table 1. The prevalence of HBsAg was 0.41% (16 cases). Total anti-HBc antibodies, indicative of a resolved infection or contact with HBV, were detected in 3.30% of donors (128 cases). The prevalence of HCV was 0.21% (8 cases), that of HIV was 0.03% (1 case confirmed by Western blot) and that of syphilis was 0.62% (24 cases, including 13 cases of active syphilis).

Table 1 Seroprevalence of Infectious Markers

Infectious Marker	Number of positives cases	Prevalence (%)
HBs antigen	16	0,41
Total anti-HBc	128	3,30
HCV	08	0,21
VIH	01	0,03
Syphilis	24	0,62
Active Syphilis	09	-
Past Infection (Syphilis)	15	-

IV. DISCUSSION

Our study revealed an overall prevalence of 4.56% of blood-transmissible infectious markers in donors at the Moulay El Hassan Military Hospital Blood Transfusion Center in Guelmim. This prevalence is comparable to that reported in other studies conducted in Morocco [1, 3, 4] and Tunisia [6], where rates generally vary between 3% and 6%. These figures highlight the importance of maintaining constant vigilance and rigorous screening measures, even in seemingly low-risk donor populations.

Comparing our results with those of studies conducted in Europe and North America [7], we observe generally lower prevalences for most infectious markers. These differences can be explained by socioeconomic factors, variations in access to vaccination (particularly against hepatitis B), and disparities in prevention and screening policies.

The prevalence of HBsAg (0.41%) in our study is comparable to that reported in other studies conducted in Morocco, particularly in Marrakech (0.07%) [4] and Rabat (0.397%) [5]. It is also similar to data observed in some North African countries, such as Tunisia (0.3%) [6]. However, it is lower than the prevalences reported in Europe and North America, where HBsAg is generally detected in less than 0.1% of blood donors [7].

Furthermore, individual analysis of the markers highlighted important points. The prevalence of total anti-HBc antibodies (3.30%) indicates previous exposure to HBV. The presence of total anti-HBc antibodies indicates either a resolved (cured) HBV infection or contact with the virus. This prevalence is comparable to that observed in other Moroccan studies [1, 8].

The prevalence of HCV (0.21%) is similar to that reported in other Moroccan studies [4, 5] and in Tunisia [6]. However, it is higher than the rates observed in Europe and North America, where the prevalence of HCV in blood donors is generally less than 0.1% [7].

The prevalence of HIV (0.03%) is low and comparable to data reported in other blood transfusion centers in Morocco [4, 5]. This low prevalence reflects the effectiveness of prevention and screening measures implemented at the national level.

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The prevalence of syphilis (0.62%) is comparable to that observed in other Moroccan studies [1, 9]. It is important to note that syphilis can be transmitted through blood transfusion, hence the importance of systematic screening in donors.

Finally, in the context of transfusion safety, it is crucial to minimize the risk of transmission of infectious agents, including during the serological window period, where markers are not yet detectable by conventional serological tests. Viral genomic diagnosis (PCR) offers a perfect solution to reduce this window period and detect infections earlier. In addition, PCR can help identify cases of occult hepatitis B, where HBsAg is undetectable despite the presence of the virus. By integrating PCR into screening algorithms, it is certain to improve transfusion safety and prevent the transmission of viral infections.

V. CONCLUSION

This study highlights the presence of infectious markers in a significant proportion of blood donors at the Moulay El Hassan Military Hospital Blood Transfusion Center in Guelmim. The results emphasize the importance of maintaining rigorous transfusion safety measures, including systematic screening for infectious markers, confirmation of positive results, and appropriate management of infected donors. Continued awareness and prevention efforts are needed to reduce the transmission of infections through blood transfusion.

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