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Original Article

Infectious diseases screening approach among refugees: results from a single-center study

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Abstract

Introduction: Our aim was to evaluate a screening program, with active case-finding and treatment for active tuberculosis (TB), latent tuberculosis infection (LTBI), blood-borne viruses (BBV), and sexually transmitted diseases (STDs) among refugees living in facility centers.
Methodology: We collected data on refugees arriving to our attention in migrant centers in Sardinia, Italy. Socio-demographical data, anamnesis, and clinical features were collected. TST Mantoux was conducted, and X-ray chest (XRC) was performed if TST was positive. Blood-borne virus screening was proposed to all patients. Screening for STDs was offered according to guidelines, anamnesis, and physical examination.
Results: Eighty-one patients were included. Seventy (86.4%) were male, and the mean age was 24.8±5.7 years. Thirty-three (40.7%) had scabies. Overall, 40/81 (49.4%) had a positive TST Mantoux. One (2.5%) was hospitalized and died for multi-drug-resistant TB. One (2.5%) patient had intestinal-TB. 52/81 (64.2%) refused HIV screening, whereas no positivity was found among tested migrants. Sixty-two (76.5%) accepted HCV screening, and one (1.6%) had a positive test. Fifty-eight (71.6%%) accepted HBV testing, and 29 (50%) of them had positive serology. Ten (12.3%) patients had anal or genital lesions due to syphilis, Molluscum contagiosum, and HPV in 7 (70%), 2 (20%), and one (10%) case, respectively.
Conclusions: Infectious diseases control and prevention are a key strategy among refugees. The stay in a migrant center is an extraordinary occasion for healthcare provision. This condition could allow a broad screening program in which quick BBV screening tests could be a good method to implement uptake. More information and educational programs would allow a higher understanding and acceptance of HIV screening.

Key words: Refugees; migrants center; infectious diseases; tuberculosis; blood-borne viruses; STDs.

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Introduction

According to the European Center for Disease Control (ECDC) [1], in a considerable number of European Economic Area (EEA) Countries, subgroups of migrant populations such as refugees, asylum seekers, and irregular migrants are at increased risk and disproportionately affected by infectious diseases such as tuberculosis, parasitosis, HIV, and viral hepatitis [2,3].

In recent years, motivated by the increasing number of immigrants entering the EEA countries, the development of adequate immigration health policies has become a priority for many European Countries [1].

More than half of European Countries reported having implemented screening programs targeting asylum seekers in the interest of public health. This would identify potential sources of infectious diseases' spread. This approach, which could be beneficial for many communities, has been described as cost-effective, particularly when considering tuberculosis (TB), latent tuberculosis infection (LTBI), HIV, HCV, and HBV [4].

In 2014, the ECDC published its first report regarding the impact of infectious diseases on the immigrant population in Europe. Foreign-born TB cases had incidence rates 8.7-18.4 times higher than those observed in the local-born population. In the past few years, immigrants have accounted for almost 60% of all TB cases in Italy. Furthermore, immigrants born in high-incidence countries, including people from refugee-like backgrounds, are identified as high priority candidates for screening and treatment for LTBI. Post-

arrival screening and LTBI treatment can prevent TB transmission in the community and limit the number of cases and deaths from TB.

Immigrants accounted for 40% of all HIV cases diagnosed in the European Union between 2007-2011, with 54.3% of the confirmed HIV infections diagnosed in individuals from sub-Saharan Africa [6].

Hepatitis B, caused by the hepatitis B virus (HBV), is a frequent disease among immigrants, and in high prevalence areas, the transmission may occur also through vertical route and during childhood [6]. In 2011, 52.6% of HBV cases reported to the ECDC were imported (ECDC 2014). Unfortunately, limited data are available on HCV.

When evaluating the transmission of other STDs, academic literature points out a higher prevalence among immigrants of STDs, such as *Chlamydia*, gonorrhea, and syphilis [7-9].

Immigration centers provide a unique opportunity to screen refugees for infectious diseases and help health care professionals prevent further spread [10].

Our study aims to report our refugees' center experience in testing and to treat infectious diseases in the resident population, including screening and active case-finding for active TB, LTBI, blood-borne viruses (BBV), and sexually transmitted diseases (STDs).

Methodology

Patients and methods

We conducted a survey including data from refugees in immigration centers upon their arrival in Sardinia, Italy, between November and December 2019. Socio-demographical data, anamnesis, and clinical features were collected from patients' medical records.

Table 1. Socio-Demographics characteristics of 81 refugees included in our study.

Variable	Result
Age (years), mean (±SD)	24.8 (± 5.7)
Male gender	70 (86.4%)
Sex behaviour	
Heterosexual	64 (79%)
MSM	13 (16%)
Sex workers	4 (5%)
Nationality	
Federal Republic of Nigeria	36 (44.4%)
Republic of Ghana	2 (2.5%)
Republic of Guinea	24 (29.6%)
Republic of Senegal	15 (18.5%)
Republic of Sierra Leone	4 (5%)
Tuberculosis	2 (2.5%)
Scabies	33 (40.7%)

SD: standard deviation; MSM: man who have sex with man.

Laboratory assessments

Regarding TB, Mantoux tuberculin skin test (TST) was performed and examined after 48 and 72 hours. Positivity was considered in case of induration >10 millimeters (mm) [11]. After assessing positivity, a Chest X-ray (CXR) was performed. Mycobacterium tuberculosis's search on sputum, blood, urine, and stool was performed among symptomatic patients.

Upon arrival, all refugees were asked to be screened for BBVs, including HIV, HCV, and HBV. HCV screening was performed using a rapid capillary test, whereas HIV and HBV were performed on venous blood sample.

According to 2015 CDC guidelines on STDs, anamnesis, physical examination and screening for STDs was proposed [12].

Drop-out was defined as the inability to correctly assume prophylaxis or treatment due to the unexpected or sudden transfer of the migrant.

Statistical analysis

Data distribution was evaluated with the Kolmogorov-Smirnov test before elaboration. Data were elaborated as numbers on total (percentages), and median (interquartile range, IQR), as appropriate. Categorical variables were evaluated using Chi-square or Fischer's exact test, when appropriate. Multivariate analysis was conducted using logistic regression. The significance level was considered as $p < 0.05$.

Ethical issues

We conducted this survey in accordance with the Helsinki Declaration. All patients' data were and collected from routine clinical practice, fully anonymized, and retrospectively analyzed. For this type of study, neither formal consent nor Ethical Committee approval are required, according to current National law from Italian Medicines Agency and to the Italian Data Protection Authority [13]. However, all patients signed informed consent.

Results

Socio-demographic and clinical features

Overall, 81 patients were evaluated. Of them, 70 (86.4%) were male. The mean age was 24.8 ± 5.7 years. The majority (44.4%) were from Nigeria, followed by Republic of Guinea (29.6%) and Senegal (18.5%). Regarding sexual behavior, 64 (79%) were heterosexuals, and 13 (16%) were men who have sex with men (MSM). When considering infectious disease diagnosis, 33 (40.7%) had scabies and 2 (2.5%) active TB. Socio-demographic and clinical characteristics of

patients enrolled in our study have been summarized in Table 1.

Mycobacterium tuberculosis infection and active TB

All participants agreed to receive the Mantoux TST. Forty (49.4%) migrants were positive, but only one (2.5%) had lesions compatible with TB a CXR. This patient was hospitalized and subsequently died from pulmonary multi-drug resistant TB. Interestingly, one (2.5%) patient was negative to Mantoux TST, but after hospitalization for intestinal sub-occlusion, underwent surgical intervention and had a histological diagnosis of intestinal TB. All patients without TB disease underwent prophylaxis with isoniazid. Cases of active TB received treatment according to antibiotic susceptibility of the strains.

Blood-borne viruses

The majority of patients (64.2%) declined to be tested for HIV, with four people (7.7%) stating that HIV was a European disease and three people (5.8%) claiming they did not believe in the existence of HIV. The remaining participants who declined to be tested did not provide any explanation. Among people accepting the screening, nobody tested positive.

Sixty-two (76.5%) agreed to be screened for HCV; of these, one patient (1.6%) tested positive but dropped out before the treatment could be administered.

Out of the 55 (67.9%) patients who were tested for HBV, 10 (18.2%) were HBsAg positive, and in 3 (30%) HBV treatment was indicated. Unfortunately, all 3 patients dropped-out without receiving treatment. Nineteen (34.5%) patients had occult HBV infection (OBI).

Sexually Transmitted Diseases

Overall, 10 (12.3%) patients had anal or genital lesions. For all of them, dermatologic consultation was proposed. The diagnosis was syphilis, Molluscum contagiosum, and HPV in 7 (70%), 2 (20%), and one (10%) of the cases, respectively. All patients underwent treatment according to their disease.

Screening acceptance analysis

When performing logistic regression on determinants of participants' acceptance of HBV or HCV screening tests, having a positive TST was related to higher acceptance ($p = 0.036$), whereas males had a lower acceptance ($p = 0.049$). A sub-analysis on HIV screening showed that Nigerian nationality resulted in less screening refuse ($p = 0.033$). The multivariate analysis on general screening acceptance and HIV screening acceptance has been reported in Tables 2 and 3, respectively.

Discussion

Migrants are a fragile population, studied in the literature for a wide spectrum of healthcare needs [14-16].

Implementing screening programs for high-risk populations is a fundamental step in controlling infections and developing a fast test and treat strategy, as well as good prevention approaches (e.g. vaccines) [17-19].

Table 2. Logistic regression on acceptance to execute screening tests among 81 refugees included in our study.

	Unadjusted			Adjusted		
Variable	**Odds ratio**	**CI 95%**	**p-value**	**Odds ratio**	**CI 95%**	**p-value**
Nigerian	1.25	0.49-3.19	0.636			
Male gender	0.14	0.17-1.10	0.061	0.12	0.01-0.99	0.049
Age > 25 years	1.86	0.71-0.86	0.207			
High risk	1.64	0.47-5.68	0.433			
Positive TST	2.69	1.03-7.07	0.044	2.93	1.08-7.99	0.036

CI: confidence interval; TST: tuberculin skin test.

Table 3. Logistic regression for the acceptance to perform HIV test among 81 refugees included in our study.

	Unadjusted			Adjusted		
Variable	**Odds ratio**	**CI 95%**	**p-value**	**Odds ratio**	**CI 95%**	**p-value**
Nigerian	3.91	1.49-10.2	0.005	3.09	1.09-8.72	0.033
Male gender	0.25	0.07-0.93	0.038	0.43	0.18-1.76	0.424
Age > 25 years	1.09	1.01-1.18	0.041	1.13	0.43-3.04	0.803
High risk	0.53	0.15-1.84	0.319			
Positive TST	1.43	0.58-3.57	0.437			

CI: confidence interval; TST: tuberculin skin test.

Our survey showed high Mantoux TST acceptance. Instead, lower adherence to diagnostic tests with biological sampling was present. Probably, non-invasive diagnostic approaches are more accepted and should be implemented in such challenging settings. Almost half of the patients presented a positive Mantoux TST, but only one had a positive CXR. As well it is known, this derives from the high prevalence of TB infection among immigrants. However, a patient was negative to Mantoux TST but had a diagnosis of intestinal TB. Several factors may be associated with false-negative results or tuberculin less response, such as skin anergy, recent, or old TB infection [20-22]. This may explain the patient's TST negativity. Probably, QuantiFERON-TB could have been used to increase diagnostic accuracy.

Furthermore, one patient died of multi-drug resistant TB. This highlights the difficulties in TB treatment among migrants and the necessity of better TB diffusion control. Migrants experience the highest risk of TB disease development during the first 2-5 years after the migration to a low TB incidence setting, which supports the potential value of LTBI screening and treatment [23].

BBV

Regarding BBV, HCV had a prevalence of 1.6%, showing a slight difference from literature data, which normally reports a prevalence twice higher [24]. However, the mean age of our population was < 25 years. This could explain the HCV positivity rate, which is higher among elderlies. HBV infection (considering both chronic infection and OBI) had the highest seroprevalence, involving 45.3% of tested people. Vertical transmission, which is still frequent in Sub-Saharan Africa, together with sexual behavior, could explain this result. When considering only HBsAg positivity, data were concordant with available literature [25,26].

The difference of acceptance to perform HCV and HBV tests (62% vs. 55%) could be related to the fact that HCV test was performed with a rapid capillary test and not with phlebotomy. As described in literature, quick tests ensure a greater acceptance of screenings, particularly in vulnerable populations [27]. The high acceptance in people with positive TST could be explained by the fact that these patients were admitted to our Day-Hospital to perform CXR, and on that occasion, they performed the screening.

Regarding HIV, most of the patients refused the screening test. When analyzing patients' answers, there were probably some cultural barriers, which play a key role in HIV screening acceptance. The lack of knowledge of established benefits of antiretroviral therapy, such as the complete control of HIV replication resulting in clinical improvement and no risk of sexual transmission, could be among those factors [28].

Vulnerable groups such as the foreign-born, often have considerable difficulties in gaining access to care. They are mostly unaware of the available therapeutic options and the implications of appropriate management of chronic hepatitis, leading to more rapid progression to advanced liver disease and its fatal complications. It should be underlined that most individuals with chronic hepatitis remain substantially asymptomatic and therefore underestimate for a long time in the disease progression, until liver damage has become severe and largely irreversible. Moreover, since chronic hepatitis B in migrants often results from unrecognized congenital infection, advanced cirrhosis and hepatocellular carcinoma may be observed even in young patients, with a substantial impact on their ability to work and life expectancy [29]. Actually, high effective drugs with low side effects are available and should be offered to prevent advanced disease [30].

A better counseling approach with educational programs may be required among this population to increase their perception of healthcare needs [31]. In general, being Nigerian was associated with higher test acceptance. In a previous study on irregular migrants, the same association was found [32]. These data suggest Nigerian origin is a significant factor in both subpopulations when considering healthcare use and could be related to a better educational level in the Country of origin.

STDs are the most important world health problem, and their disparities in underserved populations, such as migrants, have been widely discussed in the literature [8,17,31]. Our data confirmed the high rates of STDs, with a prevalence of 12.3%. In these settings, fast case finding and treatment may result in better infection control, with benefits for the community. In any population, infectious diseases spread is related to contacts between susceptible and infected people, and migration has been shown to concur with this mechanism [33]. Interestingly, the only HPV-related lesion was found in a male patient, demonstrating both sexes' involvement [34].

Conclusions

Infectious diseases control and prevention are key strategies among refugees. Being in a refugee center is an extraordinary occasion for health care provision, and for a broad screening program diffusion. However,

migrants enrolled in our study had less compliance with phlebotomy, resulting in a barrier to screening. This highlights the usefulness of quick test proposals in migrant facilities. The main difficulty was related to HIV test acceptance, thus pointing out a cultural barrier, as well as the necessity of more information and educational programs embedded in the counseling program, given the low perception of HIV infection risk.

Besides, further efforts to raise patients' awareness are also need given the low treatment adherence among people who tested positive for viral hepatitis. Since chronic hepatitis B in migrants often results from unrecognized congenital infection, advanced cirrhosis and hepatocellular carcinoma may be observed even in young patients, with an important impact on their ability to work and live.

Limitations of the study

Some limitations must be addressed in our study. Firstly, this is a monocentric study and may not reflect the Italian situation. Furthermore, data were collected retrospectively, and this may reduce the study strength. The majority of participants were from Nigeria and male. This could possibly represent a bias related to the level of education and sex prevalence when performing the statistical analysis.

Authors' contributions

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by VF, ADV, PM, EP, and NG. The first draft of the manuscript was written by VF, ADV, and PM, and all authors commented on previous version of the manuscript. All authors read and approved the final manuscript.

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