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Risk of Hospitalizations for Infectious and Parasitic Diseases in Native and Migrant Populations of the Lombardy Region

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INTRODUCTION

Migrant populations mainly move from low- and middle-income countries in Europe, Asia, Africa, and South America. Compared to host populations, they show different patterns in the prevalence of infectious and chronic diseases that change over time and across generations. Upon arrival, migrants tend to be healthier due to the "healthy migrant effect", but their health deteriorates the longer they reside in the host country [1]. In Italy, foreign residents encompass 8.6% of the total population (about 5 million people), highlighting the need to monitor their health, especially infectious and parasitic diseases (IPDs), which are a critical growing issue for public health [2]. The availability of population-based data is essential for developing prevention and control strategies to reduce this burden.

OBJECTIVES

The main objectives of this cohort study were to examine the occurrence of the first hospitalization due to infectious and parasitic diseases among the assisted population in the Lombardy Region and to compare the probability of such an event between individuals from foreign birth countries, regarded as migrants, and Italian natives, adjusting for sex and age effects. Since only birth countries rather than citizenships were available, in our study, we considered the individuals born abroad as migrants.

METHODS

We obtained the cohort from the Health Service database of the Lombardy Region. We included individuals aged 18 to 65 years in the period 2010–2019 who began to be assisted before 2010. Each participant was monitored to identify any hospitalization due to IPDs according to ICD-9 codes 001–139. We excluded any hospitalizations that occurred before 2011 to ensure that only incident hospitalizations entered the study.

We classified each individual based on his/her birth country to distinguish migrants from Italian natives and, among migrants, those coming from countries with higher migratory pressure. To this end, we combined the ISTAT classification of foreign territorial units [3] with the one considered in [4] that distinguishes High Migratory Pressure Countries (HMPC) from Highly Developed Countries (HDC). This way, we obtained the following seven areas: Italy, regarded as the reference area for the analyses; five HMPC areas, each corresponding to Africa, Central-South America, Asia, the European Union (EU) (with Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia), and Eastern Europe with countries outside EU (e.g., Moldova and Ukraine); one HDC area comprising countries both in Europe (e.g., Germany and the United Kingdom) and outside Europe (e.g., Israel, Japan, and U.S.A.).

To meet our study objectives, we performed a survival analysis using the Cox proportional hazard regression model, assuming the first hospitalization for IPDs as the outcome and the deceased individuals or emigrants from the Lombardy Region during the follow-up as censoring. As independent variables, we included the classification in seven areas of the birth countries, sex, and age as main effects and first- and second-order interactions. The results are presented as hazard ratios (HRs) with 95% Wald confidence intervals (CIs). All the statistical analyses were carried out using the SAS Studio software version 9.4.

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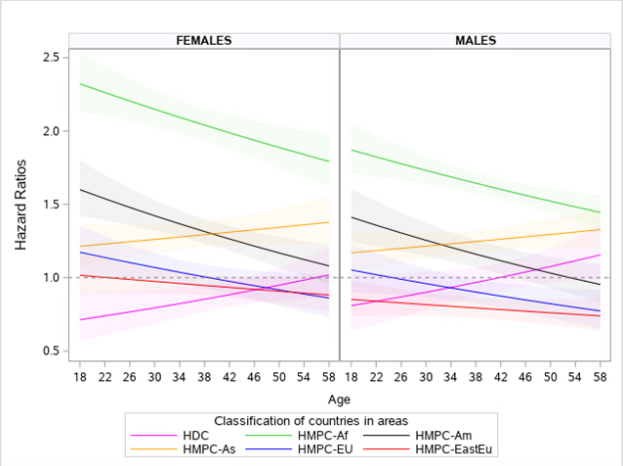
RESULTS

Our study set comprised 5,098,372 individuals: 84.97% Italian natives, 13.56% from the HMPC areas (Africa: 3.81%, Central-South America: 2.37%, Asia: 2.80%, EU: 2.12%, and Eastern Europe: 2.46%), and 1.48% from the HDC area; 49.23% were females (mean age in 2010: 38.28 ± 10.13 years), and 50.77% were males (mean age in 2010: 38.16 ± 10.09 years). A total of 66,934 individuals (1.31% out of 5,098,372) reported new hospitalizations for IPDs (the event of interest) during follow-up, who represented 1.29% in Italy; in HMPC areas: 2.07% for Africa, 1.39% for Central-South America, 1.45% for Asia, 1.04% for EU, 1.00% for Eastern Europe; in HDC area: 1.17%. The most occurring diseases were those in ICD-9 codes 030–041 (other bacterial diseases such as leprosy, diphtheria, and scarlet fever), amounting to 45.28% of the 66,934 individuals with the event.

The final Cox model, which did not include the non-significant second-order interaction, revealed significant differences affecting certain areas compared to the Italian natives. Figure 1 depicts the HRs of females and males for HMPC and HDC areas against age, using Italian females and males as references. Given the absence of the second-order interaction, the HRs of females have the same trend for each area as those of males. Nevertheless, regardless of age, African females have significantly higher HRs than males. For instance, with age fixed at 18, the HR of HMPC-Africa vs. Italy is equal to 2.32 (CI: (2.14, 2.52)) in females and 1.87 (CI: (1.71, 2.05)) in males; with age fixed at 54, the HR of HMPC-Africa vs. Italy is equal to 1.84 (CI: (1.69, 2.01)) in females and 1.48 (CI: (1.39, 1.58)) in males.

Moreover, in both panels, the gap in terms of risk of Africa, Central-South America, EU, and Eastern Europe compared to Italy decreases with age, while that of Asia and HDC increases. The risk of the event occurring is always significantly higher in African and Asian migrants than in Italians, regardless of sex, while it is significantly lower in Eastern European males than in Italian males. In Central-South American females, the risk is significantly higher than in Italian females up to 54 years, while in males, it is up to 44 years. Finally, HDC females have a significantly lower risk than Italian females up to 44 years, while no significant difference is detected for males.



approach an effective prevention and/ or monitoring plan.

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