Demographic and epidemiological characteristics of Ukrainian refugees in an Italian Local Health Authority

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Background: The Russian invasion of Ukraine caused millions of Ukrainian refugees to flee to other nations. To provide the most appropriate assistance, host nations necessitate up-to-date information regarding Ukrainian refugee's demographic and epidemiological conditions. We aim to investigate the demographic composition, the COVID-19 vaccinations performed, specialist care provided and the prevalence of non-communicable diseases (NCDs) in refugees assisted by an Italian Local Health Authority (LHA). **Methods:** We conducted a retrospective cross-sectional analysis from March to June 2022, analyzing the demographic and epidemiological status of Ukrainians. Statistical analyses were carried out to assess possible associations between NCDs distribution, age and gender. **Results:** LHA Roma 1 assisted 9349 Ukrainian refugees. Of these, 2784 (29.8%) were males and 6565 (70.2%) were females, with a median age of 25 years. Two thousand four hundred and eighty-five Ukrainian refugees were vaccinated against COVID-19. Among them, 401 (16.1%) had at least one NCD. The most frequent groups of diseases were related to the circulatory system (50.6%), the endocrine system (24.9%), and mental and behavioral disorders (6.5%). **Conclusion:** Refugees need healthcare services targeted mainly towards minors and females. It is essential to analyze and monitor the demographic and epidemiological conditions to provide evidence about patient management and the best care integrated into the health service of host countries.

Introduction

On 24 February 2022, Russia launched a full-scale invasion of Ukraine, causing turmoil and mass migration waves to neighboring countries. In response, Ukraine president Volodymyr Zelensky imposed martial law,[1] so that men aged 18–60, except for fathers with three or more children, were banned from leaving the country.[2] Ukraine is a lower-middle-income country with a population of about 44 million inhabitants[3] with a median age of 41.2 years old and the following age groups distribution: 0–14: 15.2%; 15–64: 67.4% and ≥65: 17.4%.[4] Considering the martial law and the demographic characteristic of the population, the migrating population to nations deemed safer for refugees was composed mainly of women and children. As of May 2023, ∼8 million refugees arrived in Europe, of which ∼5 were registered for temporary protection.[5] Nearly 175 000 refugees have arrived in Italy since the beginning of the war, most of them within the period going from the beginning of March to the first days of June 2022 (73.6%).[6] Refugees who arrived in Italy had access to the Italian National Health Service (NHS), which provides universal coverage essentially free of charge at the point of delivery.[7] In this context, the Italian Government put in place a series of procedures to support the population and facilitate the stay of Ukrainian refugees in the territory, with a focus on population health interventions (e.g. the COVID-19 vaccination), housing, the regularization of their position in Italy, and other helpful information.[8] The first contact between the Ukrainian refugees and the NHS is with the Reception Centers of the Local Health Authorities (LHAs) that allow the registration with the NHS, free of charge when the foreign person is a refugee with a regular

certificate attesting refugee and/or asylum seeker status. Moreover, LHAs promote and protect the health, both at individual and community levels, of the resident population and of those present in any capacity in its territory, guaranteeing the essential levels of care defined by the National and Regional Health Services.[7] In this context, all applying migrants were provided with an STP code (Straniero Temporaneamente Presente—Foreigner Temporarily Present) with a nationwide validity and a duration of 6 months. People with STPs are mostly exempt from participation in healthcare costs for many health services, including urgent outpatient services with direct access (emergency room, on-call doctor), general medical examinations in public facilities, disease prevention and prophylaxis interventions aimed at public health protection and compulsory vaccinations.[9] Refugees assisted in the LHA Roma 1 were firstly referred to the Reception Centers where they were assigned the STP code. Then, according to the Ministerial decree and the Lazio Region decree for the management of Ukrainian refugees, a multiprofessional team assessed their health condition and needs (legal acts related to the management of Ukrainian refugees deliberated by the Ministry of Health and the Lazio Region are given in the Supplementary material). During first assistance, the priority was identifying people with urgent needs and specific vulnerabilities, and to perform a COVID-19 swab and a screening questionnaire for active tuberculosis. COVID-19 vaccination was strongly recommended during the health counseling. Vaccination was therefore performed on a voluntary basis, but the presence of the Green Pass (COVID-19 Vaccination Certificate), which was required for most activities,[10] may have improved vaccination compliance for those who were not vaccinated.

The refugee population is unique; demographic and clinical–epidemiological information are needed for appropriate healthcare programming and management of patients. In this context, the aim of this study is to describe the composition of the Ukrainian refugee population assisted by the LHA Roma 1 (7.3% of the total Ukrainian population arrived in Italy by the beginning of June 2022), the vaccinations performed, the specialist care provided, and the prevalence of non-communicable diseases (NCDs) in the vaccinated population, through the analysis of the primary data obtained during the emergency assistance efforts.

Methods

Study design

We carried out a retrospective cross-sectional analysis of the primary data collected by LHA Roma 1 regarding the Ukrainian population. In our context, the Ukrainian refugee definition also included people with valid residence permits for Ukraine but who fled the war together with Ukrainian citizens. An example is represented by foreign students who went to Ukraine for study reasons but also fled the country due to the Russian invasion. We conducted the analysis considering the period from 2 March 2022 to 2 June 2022. In particular, we considered the first 3 months since the beginning of the war, as this was the period of the largest influx of migrants to Italy and our LHA. In addition, it was necessary to collect data quickly in order to better organize care services for the migrant population, which is reflected in the epidemiological efforts of this period. During this peak period more than 70% of all refugees entered the Italian territory, with the remaining 30% entering at a constant rate in the following months. Details of the strategies adopted in the LHA for managing and organizing refugee assistance have been previously described.[9]

Data collection and refugees' assistance flow

We used a convenience, non-randomized sampling method, including in the analysis all refugees assisted at the LHA Roma 1 during the study period. Following the Ministerial and Lazio Region decrees we aimed at identifying people with special needs and specific vulnerabilities and performed a COVID-19 swab and a questionnaire for tuberculosis (figure 1).

Thus, during the first visit, the physician, together with a cultural mediator, would ask and assess whether refugees needed urgent care for chronic or acute conditions. Given the emergency context, a full medical history was not collected for all refugees, which was instead explored before the COVID-19 vaccination for those who requested it (figure 1). In particular, COVID-19 vaccination was voluntary, and COVID-19 vaccination status was ascertained during the first interview. Those who were not covered received a strong recommendation to receive vaccination, including those who did not have any vaccination proof. NCDs information was exclusively obtained during the pre-vaccinal anamnestic interview, to ascertain comorbidities and contraindications to vaccination. Hence, information about NCDs was also obtained opportunistically.

Data extraction

The information obtained during the vaccination of refugees was then inserted into the GEVA platform (GEstione VAccinati—'management of vaccinated people') by the vaccination team. The medical history was obtained by an interview with the physician along with the interpreter. Thus, for our analyses, we extracted the anamnestic data exclusively of the refugees that were registered and vaccinated in our LHA, to identify the NCDs and their relative classification of The International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10).
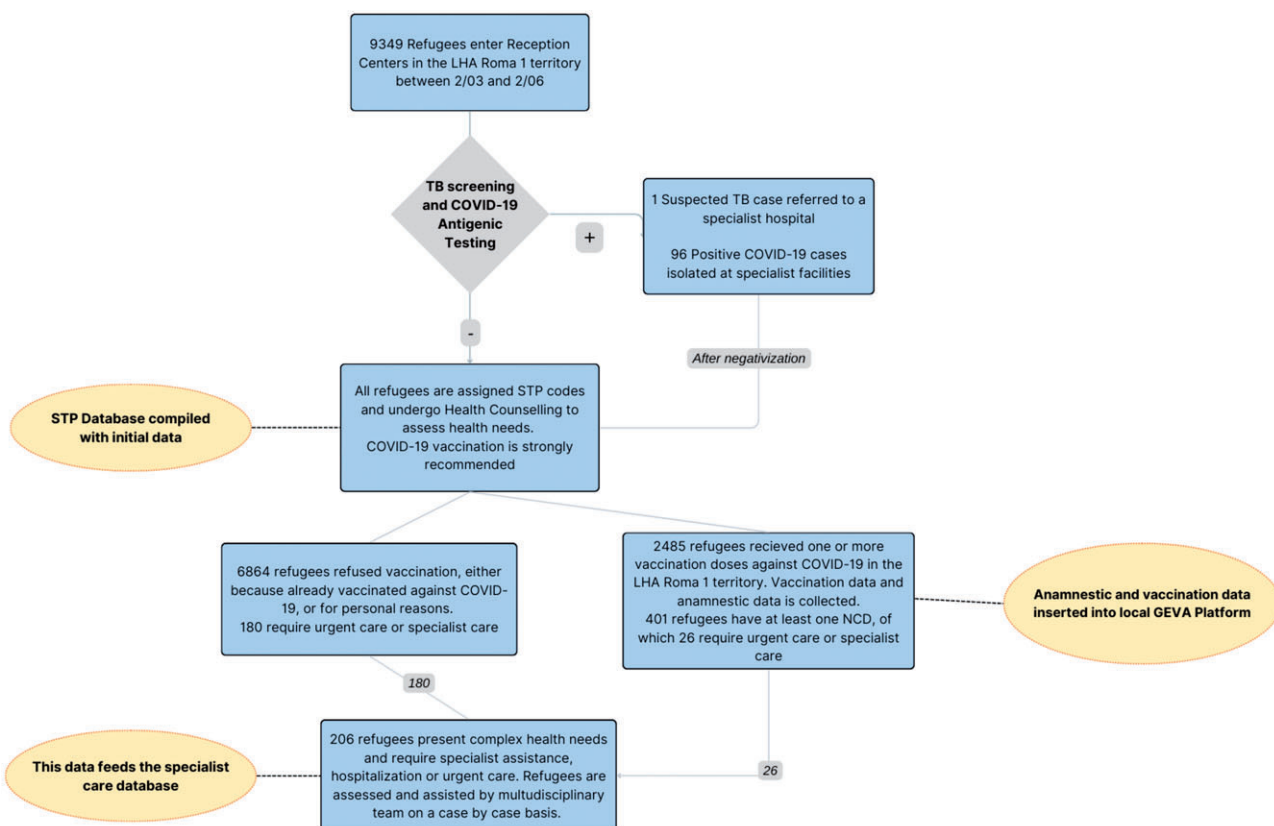
Figure 1 Assistance flow for Ukrainian refugees among LHA Roma 1. GEVA, Gestione Vaccinati—platform to the management of vaccinated people; LHA, Local Health Authority; NCD, non-communicable disease; NHS, National Health System; STP, Straniero Temporaneamente Presente—Foreigner Temporarily Present; TB, tuberculosis

Ethical approval

Enrollment for vaccination against COVID-19 was voluntary and refugees gave their consent to data collection and processing at the time of vaccination. Participation was free and unpaid. Analyses were carried out retrospectively guaranteeing the anonymity of the data. The study was approved by the 'Comitato Etico Lazio 1', the Lazio Region Ethical Committee, protocol number 857/CE Lazio 1.

Statistical analyses

Statistical analyses (Chi-squared, Shapiro–Wilk, U Mann–Whitney test when appropriate) were carried out using SPSS software (release 27.0.1.0). Logistic regression was performed using Jamovi (version 2.0.0.0). We considered statistically significant values of $P < 0.05$.

Results

Demographic characteristics and infectious diseases prevalence

Between 2 March and 2 June, 9349 Ukrainian refugees were assisted and assigned an STP code in the LHA Roma 1. The majority of STP codes (66.3%) were released during the first 4 weeks (Supplementary figure S1). Out of 9349 refugees, 2784 (29.8%) were males and 6565 (70.2%) were females; the median age was 25.0 (IQR 10–39) (table 1). Males were significantly younger (median age 12 years) than females (median age 31 years) (P values <0.01). The pediatric population (age <18 years) counted 3921 children and adolescents (41.9%), while adults (18–64 years of age) were 4999 (53.5%), and the elderly (age $\geq$ 65) were 428 (4.6%). In one case, it was not possible to retrieve the age of the refugee. The distribution by age group varied considerably in relation to gender (Supplementary figure S2). While in pediatric age the two genders were numerically similar, in the adult and geriatric group, the number of women was higher than men. In this context, we found a significant difference in the age distribution between the two genders ($P < 0.01$).

Considering infectious diseases such as COVID-19 and tuberculosis (TBC), all refugees underwent a screening test. For TBC, a specific questionnaire[11] was administered to assess potential risks of exposure. In this context, 96 people (1.0%) resulted positive for the COVID-19 swab test, and one person resulted positive for TBC screening, with a prevalence of 0.01%. All these patients were directed to appropriate assistance facilities, in order to be evaluated and followed by a specialist team.

COVID-19 vaccination and age groups distribution

During the considered period, 2485 Ukrainian refugees were vaccinated against COVID-19, of whom 569 (22.9%) were male and 1916 (77.1%) were female (table 1). Of these, 1224 (49.3%) were booster doses and 1261 (50.7%) primary cycle doses (first or second dose). The median age was 33 years. The majority of vaccinations (69.4%) were performed during the first 4 weeks (Supplementary figure S3). Gender was distributed unequally across age groups ($P < 0.01$), with a majority among females. Finally, the median age among females was 35 years, which was higher than males (18 years) ($P < 0.01$).

NCDs and relationship with age and gender

Out of 2485 COVID-19 vaccinated subjects, 401 (16.1%) had at least one NCD. Of these, 334 (83.3%) had a single NCD and 67 (16.7%) had more than one NCD, according to the ICD-10 classification. Patients were mostly affected by diseases of the circulatory system, endocrine, nutritional and metabolic diseases, as well as mental and behavioral disorders (table 2). Specifically, the most common diseases were hypertension (42.1%), hypothyroidism (15.9%) and diabetes (7.9%).

Table 1 Age and gender distribution of Ukraine refugees assisted in the LHA Roma 1

Age group	Male (%)	Female (%)	Total (%)
0–4	450 (49.3)	912 (50.7)	912 (9.8)
5–9	622 (51.6)	1206 (48.4)	1206 (12.9)
10–14	561 (48.8)	1149 (51.2)	1149 (12.3)
15–19	319 (36.4)	876 (63.6)	876 (9.4)
20–24	79 (16.5)	480 (83.5)	480 (5.1)
25–29	83 (13.9)	598 (86.1)	598 (6.4)
30–34	120 (13.9)	865 (86.1)	865 (9.3)
35–39	149 (14.3)	1040 (85.7)	1040 (11.1)
40–44	104 (16.2)	643 (83.8)	643 (6.9)
45–49	63 (16.6)	379 (83.4)	379 (4.1)
50–54	40 (14.4)	278 (85.6)	278 (3.0)
55–59	27 (11.6)	232 (88.4)	232 (2.5)
60–64	70 (26.7)	262 (73.3)	262 (2.8)
65–69	47 (25.0)	188 (75.0)	188 (2.0)
70–74	30 (22.7)	132 (77.3)	132 (1.4)
75–79	12 (24.0)	50 (76.0)	50 (0.5)
80–84	6 (12.2)	49 (87.8)	49 (0.5)
85–89	1 (20.0)	5 (80.0)	5 (0.1)
90–94	1 (33.3)	3 (66.7)	3 (0.03)
>95	0 (0.0)	1 (100.0)	1 (0.01)
Specific age groups	**Male (%)**	**Female (%)**	**Total (%)**
<18	1926 (49.1)	1995 (50.9)	3921 (41.9)
18–64	761 (15.2)	4238 (84.8)	4999 (53.5)
≥65	97 (22.7)	331 (77.3)	428 (4.6)
Total[a]	**2784 (29.8)**	**6564 (70.2)**	**9348 (100.0)**

a: One missing.

Table 2 Prevalence and distribution of NCDs among refugees assisted by the LHA Roma 1

Most relevant non-communicable diseases	ICD-10	Proportion of the specific disease[a] (n and %)	Prevalence (%) on the total population ($N = 2485$)
Diseases of the circulatory system	IX	203 (50.6)	8.2
Endocrine, nutritional and metabolic diseases	IV	100 (24.9)	4.0
Mental and behavioral disorders	V	26 (6.5)	1.0
Diseases of the digestive system	XI	25 (6.2)	1.0
Diseases of the respiratory system	X	24 (6.0)	0.9
Diseases of the musculoskeletal system and connective tissue	XIII	20 (5.0)	0.8
Diseases of the nervous system	VI	19 (4.7)	0.8
Neoplasms	II	11 (2.7)	0.4
Other	–	39 (9.7)	1.6
Total[b]	**–**	**467 (100)**	**–**

a: The proportion of the specific disease is in relation to the total number of identified diseases (467) among 401 people with at least one NCD.
b: The total number of the diseases is higher than 401 as 67 subjects had more than one NCDs.

As shown in table 3, the prevalence of NCDs differs by gender and age, and it is higher in women (17.4%) than in men (11.8%) ($P < 0.01$). The logistic regression demonstrated that the prevalence of NCDs was statistically significantly correlated with age ($P = 0.01$) (Supplementary table S1).

Table 3 Age class and NCDs distribution by gender in vaccinated refugees assisted in the LHA Roma 1

Age group	Male (%)	Female (%)	Total (%)	Male with at least one NCDs	Prevalence (%) of NCDs in males	Male with at least one NCDs	Prevalence (%) of NCDs in females	Total (%)
<18	281 (48.3)	301 (51.7)	582 (23.4)	14 (53.8)	5.0	12 (46.2)	4.0	26 (23.4)
18–64	255 (14.8)	1472 (85.2)	1727 (69.5)	36 (13.4)	14.1	232 (86.6)	15.8	268 (69.5)
≥65	33 (18.8)	143 (81.2)	176 (7.1)	17 (15.9)	51.5	90 (84.1)	62.9	107 (7.1)
Total	569 (22.9)	1916 (77.1)	2485 (100.0)	67 (16.7)	11.8	334 (83.3)	17.4	401 (16.1)

Secondary assistance

Considering the whole population, out of 9349 refugees, 206 (2.2%) needed urgent secondary assistance (hospitalization or specialist care visits). The most frequently accessed specialist areas were endocrinology (12.1%), neurology (9.2%), cardiology (8.7%), oncology (7.8%), gynecology (7.3%) and psychiatry (7.3%) (Supplementary table S2).

Discussion

In this study, we analyze the demographic and epidemiological characteristics of a large sample of Ukrainian refugees received by LHA Roma 1 in the 3 months following the beginning of the war. Analyzing these factors in populations fleeing the war is crucial, as it allows for the preparation of the best social and healthcare protection, considering the context of origin.[12,13]

We observed that most refugees arrived in the first few weeks after the beginning of the conflict, confirming how the largest migration flows occur in the days immediately following a forced migration such as environmental hazards or wars,[14,15] thus requiring a high level of initial preparedness on the part of the host countries.[13,16] In particular, in our case, as well as at the International and National level,[6,17] the migrant population is mainly represented by women and young people, as is to be expected due to the martial law[1] applied in Ukraine, that prohibits males between 18 and 60 years from leaving the country. In addition to this, it is important to consider the context from which the fleeing population comes, being, in this case, the average age in Ukraine of 44 years, with more than 70% of the population aged 0–64 years.[4]

Similarly, analysis of the prevalence of diseases in the population is required to guarantee appropriate assistance to patients.[17–19] In our population, the most common diseases are those of cardiovascular system (hypertension and diabetes) and metabolic disorders, with an overall prevalence of 16.1%. The Ukrainian population is particularly susceptible to NCDs due to the high presence of risk factors, such as tobacco use, alcohol, reduced fruit and vegetable consumption, and high salt consumption, especially in men.[20] We found a prevalence of NCDs that is lower than that usually found in the Ukraine population and other studies,[20–22] which, however, could be explained by the fact that our sample consists mostly of women younger than 65 years of age. On the other hand, the distribution of diseases in our sample (hypertension, diabetes and metabolic disorders) is similar to that found in the general population and in case studies similar to our.[20–23] Finally, the prevalence we measured is similar to that found in a survey of Syrian refugees in Turkey (15.2%) among people aged 18–69 years.[24] The experience of refugees from the Syrian war, in general, demonstrates that NCDs are a significant problem.[25–28] Moreover, we observed a high prevalence of hypothyroidism and metabolic disorders, which could be due to the 1986 Černobyl' accident[29,30] and the subsequent lack of mandatory salt iodization.[31]

Another important issue that we faced concerns mental disorders. Migrant populations, in fact, are vulnerable to the onset of depression, anxiety and post-traumatic stress disorder.[32,33] In addition, ∼33% of the Ukraine population experience mental health disorders, with one of the highest suicide rates in the world,[34] thus confirming the importance of considering this issue in the healthcare assistance

of this population. In this context, although the prevalence of pre-existing mental disorders in our sample was ∼1%, the service of care for these patients was promptly activated, especially for the management of pathological conditions that will develop as a result of migration. However, the prevalence of mental health disorders may be underestimated. In fact, this figure strictly refers to pre-existing conditions reported by patients and does not consider the later development of these types of disorders nor those that were not communicated. In addition, the nature of the intervention did not allow us to thoroughly assess the mental health status of all refugees. In this context, further analysis on this specific topic should be addressed, in order to identify all patients affected by these conditions. In this context, it is a priority for Institutions and the Healthcare System to develop a syndromic surveillance system of refugees' health status,[35] with a special focus on mental health diseases, in order to intercept the needs of refugees, which could be elusive during the early stages of care or arise later.

The analysis of the epidemiology of infectious diseases is similarly important, especially in the Ukrainian context, where TB, Polio and HIV are still present with prevalence among the highest in the European region,[35] as well as the SARS-CoV-2 (with low vaccination coverage, of about 72.0%, as of 21 February 2022).[36] For this reason, screening for TB and COVID-19, childhood vaccinations, and accurate medical history are essential on the one hand to highlight cases of disease and treat them, and on the other hand to limit the introduction of infectious diseases (especially if preventable by vaccine) into the host country.[37]

Finally, the organization of the healthcare system and the management of migrants in LHA Roma 1 was possible through strong leadership, preparedness, adaptive capacity and resilience, critical to ensure proper management of the emergency.[38] At the same time, appropriate stewardship[39] is essential to guarantee rapid organizational interventions and to provide the appropriate services for migrants. In this context, a multidisciplinary intervention, involving healthcare workers, social workers and cultural mediators, made it possible to overcome logistical, relational, and fiduciary barriers and difficulties that could have had a negative impact on the migrants' assistance.

Our study presents some limitations. First, we collected data on NCDs from a limited sample of people, and the collection of data about these diseases was obtained during the vaccination anamnesis. It was, therefore, necessary to manually process the medical history to extrapolate data on NCDs. However, data were collected during a medical examination in the presence of interpreters, ensuring the accuracy of the information reported. Moreover, since this is an oral interview, there may be an underestimation of the prevalence of reported diseases. Our study used a non-randomized method, which therefore considers only the data of refugees assisted at our LHA and not on the whole national area. Moreover, data integration with other LHAs has not been possible due to differences is data collection and refugee crisis response organization. Despite this, most of the refugees arriving in Rome have been assisted by the LHA 1 (7.3% of the total refugees arrived in Italy, as of June 2022), whilst the remaining LHAs assisted refugees on a case by case basis. Thus, we believe that our sample is sufficiently large and is highly representative of the total refugee population.

Finally, our sample consists mainly of adult women, making generalization of the results difficult. However, this finding is common with war migration flows, providing an important demographic and epidemiological indication of the migrant population fleeing conflict.

This study shows the response of a Local Health Authority of the Italian NHS to the emergency caused by the war in Ukraine. The analysis of the demographic and epidemiological conditions of migrants, as well as the situation on the ground, is essential to ensure proper care of the population in both the short and long term, in order to meet the health needs. In fact, providing evidence allows decision-makers to be informed on how to facilitate system adaptation to an emergency crisis, as well as ensure proper health and social care of the migrant population, strengthening the public health and humanitarian response.

Supplementary data

Supplementary data are available at *EURPUB* online.

Acknowledgements

Funding

Conflicts of interest: None declared.

Data availability

Anonymized databases are property of LHA ASL Roma 1 and are available under a reasonable request.

Key points

- The analysis of the demographic and epidemiological conditions of migrants is essential to ensure proper care of the population
- Providing evidence allows decision-makers to be informed on how to facilitate system adaptation to an emergency crisis
- The migrant population is mainly represented by women and children, who have requested assistance for cardiovascular, endocrinological, and mental disorders conditions

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