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Health profile and disease determinants among asylum seekers: a cross-sectional retrospective study from an Italian reception centre

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ABSTRACT

Background Data on diseases' determinants and health status of asylum seekers (ASs) are limited.

Methods We performed a cross-sectional retrospective study in a large ASs centre in Italy. Data were collected during a 1-year period. Descriptive statistics were calculated. A χ^2 test was used to assess the association between socio-demographics characteristics of ASs and screening test results. A multiple logistic regression analysis was performed to identify diseases' predictors by using ICD-10 diagnoses classification as outcome variable, socio-demographic characteristics as independent variable and visits' number as confounding variable.

Results Overall, data on 792 ASs (mean age 27 years, 80% males, 58% from Africa) were assessed, 43% underwent voluntary infectious diseases screening and 2843 diagnoses were recorded. The most frequent diagnoses were: respiratory diseases, symptoms/signs not elsewhere classified, digestive diseases and infectious diseases. Gender was the most frequent predictor of ICD-10 diagnoses, while African origin, civil status and education were, respectively, predictive of cardiovascular and infectious diseases, genitourinary diseases and pregnancy-related disorders. Higher mean age was associated with syphilis, HIV and HCV infection and African origin with HIV infection.

Conclusions Communicable diseases were not prevalent in the ASs population we analysed. A stronger cultural mediation support is needed to facilitate prevention, access and continuity of care for ASs.

Keywords asylum seekers, healthcare, migration, infectious diseases screening

Introduction

According to United Nations (UN) agencies, there are >10 million refugees (80% hosted in developing countries).[1,2] During 2013, a total of 612 700 new asylum applications were registered in the 44 industrialized countries, 65% in the European Union (EU) countries, with a significant increase (+32%) of claims, mostly related to the ongoing war in Syria.[3] In 2013, the main receiving industrialized countries were: Germany (18%), USA (14%), France (10%), Sweden (9%), Turkey (7%), UK and Italy (5%).[3]

In Italy, an asylum seeker (AS) is a person who applies for asylum status, while a refugee is a person who is granted asylum status.[4] The majority of asylum applications in Italy are from migrants arriving by sea[3]: after the peak related to the North African 'Arab spring' in 2011 (34 100 claims), there was a drop in 2012 (17 350 claims) and an increase in 2013 (27 830 claims).[3] The popular press often depicts migrants by sea in defamatory terms, even if >70% of them have the

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right to apply for protection. Moreover, foreigners staying in Italy for humanitarian reasons account for 1.8% of the foreign-born persons living in the country and 0.13% of the total resident population.[5]

In agreement with EU legislation (Dublin Regulation), ASs who reach the EU must remain in the first country of entry until their request is finalized, even if this country is not their final destination. According to Italian laws, during the evaluation of asylum application, ASs can be hosted in Asylum Seekers Centres (ASCs), where they receive social, health and legal assistance—currently, there are nine ASCs in Italy. Moreover, ASs have free access to the public health system, although language barriers often hamper their use.[6] During the dwell time in the ASCs, although there are no formal obligations, ASs are advised to consult the internal healthcare facility (IHCF) to evaluate their medical condition and allow appropriate management of any health needs. In Italy, there are no guidelines for health management of migrants hosted in ASCs, even if the dwell time can reach 9–12 months.

The aim of our study is to describe the health profile of ASs hosted in the ASC of Castelnuovo di Porto (Rome, Italy) and to investigate diseases' predictors, in order to implement health assistance to this vulnerable group. For this purpose, we performed a retrospective analysis of data from the IHCF database recorded during a 1-year period.

Methods

The present work is a cross-sectional retrospective study that analyses data collected at the IHCF of the ASC of Castelnuovo di Porto (Rome, Italy) during a 1-year period (March 2012–February 2013). According to the internal procedure, each AS who accessed to the IHCF for the first time was interviewed through a standardized questionnaire focused on socio-demographic data and medical history. The interview was performed by the physician with the support (when available) of mediators speaking the patient's mother tongue, with minors, the parent/carer was interviewed. Countries of birth were classified as geographic macro-areas according to the UN Statistic Division.[7] Based on physical examination findings, individual diagnosis for each visit was recorded according to the International Classification of Diseases (ICD-10). Psychiatric disorders were not included in the study.

In order to avoid an over-estimation of chronic diseases prevalence, all accesses by a same patient for the same reason, occurred within a short-time period, were counted as single record.

Infectious diseases screening was offered to all adults (≥18 years) examined. After receiving informed consent, screening tests were performed in external laboratories. Hepatitis B virus surface antigen (HBsAg) and antibody (HBsAb), hepatitis C virus antibody (HCV-Ab) and human immunodeficiency virus antibody (HIV-Ab) were detected by a third-generation enzyme-linked immunoassay (ELISA). HIV-Ab-positive tests were confirmed by western blot. Screening for hepatitis B was based on two determinations of HBsAg and HBsAb during a 6-month period. Venereal Disease Research Laboratory (VDRL) and *Treponema pallidum* particle agglutination assay (TPHA) were also carried out. All positive screened cases were referred to public hospitals for follow-up. For tuberculosis (TB) diagnosis and surveillance, an internal algorithm[8] based on clinical and anamnestic evidences was applied, but no active screening was realized.

Descriptive statistics were used to assess socio-demographic characteristics, screening tests results and ICD-10 diagnosis. Results were also expressed as mean and standard deviation ($\pm$ SD). For each screening test, the prevalence was computed with 95% confidence interval (95% CI) and a χ^2 test was used to detect differences between groups and predictive indices. Multiple logistic regression analysis was performed to identify diseases' predictors of clinical diagnosis using: (i) the ICD-10 diagnosis as an outcome variable; (ii) the socio-demographic characteristics (birth country, age, gender, education, civil status, occupation, tobacco and alcohol consumption) as independent variable; (iii) the medical examinations' number as confounding variable. Analyses were carried out using Stata 10.1 software—$P < 0.05$ were considered statistically significant. All activities were performed at the request of the AS, regardless of the refugee status application and does not affect it. The public authority (Prefecture of Rome) in charge of the ASC approved data collection and use. The study was carried out according to the Helsinki Declaration. Ethical approval was not required because the study was based on data routinely collected and stored according to the Italian law on privacy.

Results

Socio-demographic characteristics of the population study

During the study period, the ASC housed a total of 1151 ASs (excluding 161 ASs housed for <1 week), of which 7.6% were children (<14 years old). The mean length of stay at the ASC was 268 days per person and the monthly average of ASs present was 607 (525–649). The study population was 792 ASs (79.9% males), including 64 children, examined at the IHCF during the study period. Table 1 summarizes the socio-demographic characteristics of the population study. Overall, 2843 individual diagnoses were reported, together with 26 328 nursing activities, including administration of drugs by DOT (Directly Observed Therapy).

Table 1 Demographic characteristics of ASs ($n = 792$)

Characteristics	*Africa*			*Asia*			*America*	*Total*
	West[a]	*East*[b]	*North*[c]	*Central*[d]	*South*[e]	*West*[f]	*South*[g]	
Gender								
M (%)	238 (80.4)	60 (57.1)	29 (61.7)	11 (68.8)	216 (98.2)	78 (74.3)	1 (33.3)	633 (79.9)
F (%)	58 (19.6)	45 (42.9)	18 (38.3)	5 (31.2)	4 (1.9)	27 (25.7)	2 (66.7)	159 (20.1)
Total (%)	296 (37.4)	105 (13.3)	47 (5.9)	16 (2)	220 (27.8)	105 (13.3)	3 (0.4)	792 (100)
Age								
Mean age (±SD)	27.6 (±9.1)	26.8 (±8.4)	25 (±13.2)	33.7 (±8.8)	27.6 (±7.8)	26.7 (±11.3)	29 (±14.2)	27.4 (±9.4)
Number of visits								
Per person	3.7	2.9	4.2	3.2	3.6	3.4	2.3	3.6
Total (%)	1108 (39)	314 (11)	199 (7)	52 (1.8)	800 (28.1)	363 (12.8)	7 (0.3)	2843 (100)
Education[h]								
Available data (%)	124 (48.3)	57 (57.6)	19 (54.3)	15 (62.5)	110 (51.4)	37 (42.5)	2 (100)	364 (49.9)
Yes	89 (71.8)	43 (75.4)	18 (94.7)	14 (93.3)	91 (82.7)	35 (94.6)	2 (100)	292 (80.2)
No	35 (28.2)	14 (24.6)	1 (5.3)	1 (6.7)	19 (17.3)	2 (5.4)	0 (0)	72 (19.8)
Mean years (±SD)	5.6 (±5.9)	5.8 (±5.0)	7.8 (±6.7)	12 (±4.6)	7.0 (±5.5)	8.4 (±5.0)	12.0 (±0)	6.7 (±5.7)
Missing data (%)	144	42 (42.4)	16 (45.7)	9 (37.5)	104 (48.6)	50 (57.5)	0 (0)	365 (50.1)
Marital status[h]								
Available data (%)	148 (55.2)	63 (63.6)	27 (77.1)	15 (62.5)	122 (57)	41 (47.1)	2 (100)	418 (57.3)
Married (%)	42 (28.4)	34 (54)	13 (48.2)	8 (53.3)	35 (28.7)	18 (43.9)	2 (100)	152 (36.3)
Unmarried (%)	99 (66.9)	29 (46)	14 (51.8)	7 (46.7)	87 (71.3)	23 (56.1)	0 (0)	259 (62)
Widow (%)	7 (4.7)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	7 (1.7)
Missing data (%)	120 (44.8)	36 (36.4)	8 (22.9)	9 (37.5)	92 (43)	46 (52.9)	0 (0)	311 (42.7)
Occupation[h]								
Available data (%)	130 (48.3)	60 (60.6)	26 (74.3)	15 (62.5)	110 (51.4)	39 (45.3)	2 (100)	382 (52.4)
Craftsmen (%)	47 (36.1)	9 (15)	7 (26.9)	2 (13.3)	37 (33.6)	14 (35.9)	1 (50)	117 (30.6)
Trader (%)	28 (21.5)	7 (11.7)	5 (19.3)	1 (6.7)	23 (20.9)	3 (7.7)	0 (0)	67 (17.5)
Student (%)	11 (8.5)	7 (11.7)	1 (3.8)	4 (26.7)	12 (10.9)	3 (7.7)	0 (0)	38 (9.9)
Farmer (%)	13 (10)	2 (3.3)	1 (3.8)	0 (0)	12 (10.9)	1 (2.6)	0 (0)	29 (7.6)
Professional (%)	7 (5.4)	2 (3.3)	1 (3.8)	2 (13.3)	7 (6.4)	5 (12.8)	0 (0)	24 (6.3)
Military/police (%)	1 (0.8)	10 (16.7)	0 (0)	1 (6.7)	4 (3,7)	2 (5.1)	0 (0)	18 (4.8)
Public employee (%)	3 (2.3)	1 (1.6)	1 (3.8)	2 (13.3)	1 (0.9)	0 (0)	1 (50)	9 (2.4)
Unemployed (%)	20 (15.4)	22 (36.7)	10 (38.6)	3 (20)	14 (12.7)	11 (28.2)	0 (0)	80 (20.9)
Missing data (%)	139 (51.7)	39 (39.4)	9 (25.7)	9 (37.5)	104 (48.6)	47 (54.7)	0 (0)	347 (47.6)
Tobacco (daily)[h]								
Available data (%)	88 (29.8)	60 (60.6)	20 (57.1)	8 (33.3)	100 (46.7)	35 (40.2)	2 (100)	313 (42.9)
Yes (%)	20 (22.7)	8 (13.3)	7 (35)	2 (25)	39 (39)	15 (42.8)	0 (0)	91 (29.1)
No (%)	68 (77.3)	52 (86.7)	13 (65)	6 (75)	61 (61)	20 (57.2)	2 (100)	222 (70.9)
Missing	180 (70.2)	39 (39.4)	15 (42.9)	16 (66.7)	114 (53.3)	52 (59.8)	0 (0)	416 (57.1)
Alcohol (≥1 alcoholic unit/day)[h]								
Available data (%)	88 (29.8)	60 (60.6)	20 (57.1)	8 (33.3)	100 (46.7)	35 (40.2)	2 (100)	313 (42.9)
Yes (%)	12 (13.6)	2 (3.3)	3 (15)	3 (37.5)	9 (9)	11 (31.4)	2 (100)	42 (13.4)
No (%)	76 (86.4)	58 (96.7)	17 (85)	5 (62.5)	91 (91)	24 (68.6)	0 (0)	271 (86.6)
Missing	180 (70.2)	39 (39.4)	15 (42.9)	16 (66.7)	114 (53.3)	52 (59.8)	0 (0)	416 (57.1)

[a]Burkina Faso, Cameroon, Gambia, Ghana, Guinea, Ivory Coast, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Togo.

[b]Eritrea, Ethiopia, Kenya, Somalia.

[c]Egypt, Libya, Morocco, Sudan, Tunisia.

[d]Gabon, Democratic Republic of Congo.

[e]Afghanistan, Bangladesh, India, Iran, Pakistan, Sri Lanka.

[f]Armenia, Georgia, Jordan, Iraq, Lebanon, Palestina, Syria, Turkey, Yemen.

[g]Colombia.

[h]Including only adults ($n = 729$).

Study population mean age was 27.4 years. ASs were from 43 different countries, the most represented birth countries were: Pakistan (13.1%), Nigeria (12.4%), Afghanistan (10.9%) and Eritrea (7.6%). Among adult ASs ($n = 729$), data on education, civil status, occupation in the birth country and tobacco/alcohol consumption were reported, respectively, for 364 (49.9%), 418 (57.3%), 382 (52.4%) and 313 (42.9%) participants. The majority of adult ASs was schooled (80.2%), with a mean of 6.7 years of education, unmarried (62%) and employed (79%). Among adults, 91 participants (29.3%) reported tobacco smoking (93.4% males) with an average of 11.2 ($\pm$7.9) cigarettes/day, 42 (13.5%) to consume alcohol daily (83.3% males) and 22 (16.5%) to consume both regularly. On a monthly basis, 39% of ASs requested a medical visit. Among the 792 ASs examined at the IHCF, 391 (49.3%) arrived at the ASC during the 1-year observation period and their first medical visit occurred within 1 month of entry for 51.9% (203/391), between 2 and 3 months for 31.2% (122/391) and after the third month for 16.9% (66/391) of the cases.

Diagnostic groups and multiple regression analysis

Table 2 summarizes the diagnoses recorded during the study period, respiratory diseases were the most frequently reported (26.3%) showing a seasonal pattern of prevalence (October–February). Diseases for the digestive system accounted for 11.6% of total diagnoses, and an additional 5.6% (160/2843) was referable to digestive symptoms/signs not elsewhere classified. Infectious diseases ranked the fourth more frequent ICD-10 diagnostic group. Infectious enteritis was the most frequent infectious disease, due to a cluster of 41 cases related to food contamination. All cases of viral hepatitis and sexually transmitted infections (STIs) reported were identified during voluntary screening. Regarding TB, active infection was observed in six cases (four from Africa), four pulmonary and two extra-pulmonary diseases; through the consequent contact surveillance activities performed, no secondary cases and four latent TB cases (all from Africa) were identified. Out of the total examinations recorded, 192 (6.7%) ASs were referred to hospitals (18.7% by public emergency ambulance) for a second-level examination; 50 (26%) were then hospitalized for surgical (12), medical (12), psychiatric (9) and gynaecological/obstetrical (17) reasons.

Table 3 shows the results of the multiple logistic regression analysis. Gender was the most significant predictor of ICD-10 diagnostic groups recorded. African origin was predictive of cardiovascular and infectious diseases and slightly predictive of pregnancy-related disorders. Higher mean age was positively associated with cardiovascular diseases and illness related to external causes. Non-smokers were protected against cardiovascular and respiratory diseases, while teetotallers were protected against digestive, nervous, musculoskeletal/connective tissue diseases. Marital status was predictive only for genitourinary diseases; education (but not the mean years of schooling) was predictive of the ICD-10 group related to pregnancy, childbirth and puerperium. The occupation in the birth country was never a disease predictor.

Infectious diseases voluntary screening

Screening of infectious diseases (HBV, HCV, HIV, syphilis) was restricted to adults and voluntary based. Among the 729 adult ASs examined, 347 (47.6%), 77.8% males, underwent the screening and the number of tests carried out related to a single infection has been different: 168 ASs accepted to perform VDRL; 135 TPHA; 311 HIV-Ab; 334 HBsAg and HBs-Ab; and 322 HCV-Ab tests. No gender-related differences were observed in accepting the voluntary screening. The mean age was 29.8 ($\pm$7.9) years for the whole screened population. West Africa was the main area of birth (35.4%; $n = 123$), followed by South Asia (24.2%; $n = 84$) and East Africa (21.9%; $n = 76$). Data on education, marital status, occupation in the birth country and tobacco/alcohol consumption were reported, respectively, for 231 (66.6%), 298 (85.9%), 268 (77.2%) and 151 (43.5%) screened participants. Notably, the majority was schooled (88.3%), unmarried (61.7%) and employed (82.8%). Regarding tobacco and alcohol consumption, 38 (25.2%) participants reported tobacco smoking (92.1% males) with an average of 11.2 ($\pm$7.3) cigarettes/day, 16 (10.6%) to consume alcohol daily (81.2% males) and 6 (11.1%) to consume both regularly.

TPHA was positive in seven male subjects (5.2%; 95% CI 2.5–10.3), five of them from Africa, all but one VDRL negatives. Eleven ASs were HIV-infected (3.5%; 95% CI 1.2–6.2), five men (1.6%; 95% CI 0.7–3.7) and six women (1.9%; 95% CI 0.9–4.1), all from Africa. Eleven were HCV-Ab-positives (3.4%; 95% CI 1.9–6), nine men (2.8%; 95% CI 1.5–5.2) and two women (0.6%; 95% CI 0.2–2.2), five from Africa (1.5%; 95% CI 0.7–3.6) and six from Asia (1.9%; 95% CI 0.8–4.0).

Concerning HBV infection, we found 33 ASs (9.9%; 95% CI 7.1–13.5) infected with HBV (confirmed by HBV-DNA, data not shown), 28 men (8.4%; 95% CI 5.9–11.8) and 5 women (1.5%; 95% CI 0.6–3.5). Among all tested groups, West Africans showed the highest HBV prevalence (15.5%; $n = 18/116$). Moreover, 70 ASs (21%; 95% CI 17.1–25.9) were HBV-exposed (HBsAg-negative and HBs-Ab-positive), 60 men (18%; 95% CI 14.4–22.7) and 10 women (3%; 95% CI 1.6–5.5). Co-infections were found only in two cases,

Table 2 Individual diagnosis on ASs ($n = 792$) according to ICD-10 diagnostic groups (2843 medical diagnoses performed)

Diagnosis (ICD-10 classification)	*Total*			
	n	%	*M*	*F*
Diseases of the respiratory system (26.3%)	747	100	579	168
Acute upper respiratory infections	398	53.3	311	87
Other acute lower respiratory infections	173	23.2	120	53
Influenza and pneumonia	139	18.6	113	26
Other diseases of upper respiratory tract	28	3.7	27	1
Chronic lower respiratory diseases	9	1.2	8	1
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified (11.9%)	340	100	232	108
Symptoms and signs involving the digestive system and abdomen	160	47.1	99	61
General symptoms and signs	125	36.8	88	37
Symptoms and signs involving the circulatory and respiratory systems	50	14.7	41	9
Symptoms and signs involving cognition, perception, emotional state and behaviour	5	1.5	4	1
Diseases of the digestive system (11.6%)	331	100	244	87
Diseases of oral cavity, salivary glands and jaws	151	45.6	112	39
Diseases of oesophagus, stomach and duodenum	104	31.4	80	24
Non-infective enteritis and colitis	40	12.1	33	7
Other diseases of intestines	25	7.6	14	11
Other (disorders of gallbladder, biliary tract and pancreas; appendix; hernia)	11	3.3	5	6
Certain infectious and parasitic diseases (9.5%)	269	100	221	48
Enteritis of infectious origin	75	27.9	67	8
Mycoses	55	20.4	38	17
Viral hepatitis	44	16.4	38	6
Pediculosis, acariasis and other infestations	35	13.0	30	5
Infections with a predominantly sexual mode of transmission	17	6.3	16	1
Viral infections characterized by skin and mucous membrane lesions	17	6.3	14	3
Human immunodeficiency virus (HIV) disease	11	4.1	5	6
Tuberculosis (latent and active)	10	3.7	9	1
Other (helminthiasis; bacterial, viral and other infectious agents)	5	1.9	4	1
Diseases of the musculoskeletal system and connective tissue (9.3%)	264	100	221	43
Dorsopathies	153	58.0	114	39
Other disorders of the musculoskeletal system and connective tissue	50	18.9	49	1
Arthropathy	49	18.6	46	3
Soft tissue disorders	12	4.5	12	0
Diseases of the nervous system (7.3%)	209	100	149	60
Episodic and paroxysmal disorders	209	100	149	60
Injury, poisoning and certain other consequences of external causes (6.5%)	185	100	151	34
Injuries (knee and leg; head; wrist and hand; ankle and foot; thorax; neck; shoulder and arm; abdomen, lumbar, pelvis)	159	33.0	132	27
Injuries involving multiple body regions	18	9.7	15	3
Poisoning by drugs, medicaments and biological substances	5	2.7	1	4
Burns and corrosions	3	1.6	3	0
Diseases of the skin and subcutaneous tissue (5.5%)	157	100	125	32
Dermatitis and eczema	60	38.2	50	10
Infections of the skin and subcutaneous tissue	58	36.9	44	14
Urticaria and erythema	30	19.1	23	7
Other (disorders of skin appendages; other disorders of the skin and subcutaneous tissue)	9	4.5	8	1
Diseases of the genitourinary system (4.1%)	117	100	53	64
Other disorders of the genitourinary system	39	33.3	25	14

Continued

Table 2 Continued

Diagnosis (ICD-10 classification)	*Total*			
	n	%	*M*	*F*
Non-inflammatory disorders of female genital tract	32	27.4	0	32
Urolithiasis	27	23.1	20	7
Other (diseases of male/female genital or pelvic organs; disorders of breast)	19	6.8	8	11
Others[a] (7.9%)	224	100	139	85
Total	2843	100	2114	729

[a]Include: Diseases of the eye and adnexa (2%); diseases of the circulatory system (1.5%); pregnancy, childbirth and the puerperium (1.4%); external causes of morbidity (1.3%); diseases of the ear and mastoid process (1.2%); diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism (0.3%); endocrine, nutritional and metabolic diseases (0.1%); neoplasm (0.1%).

both African women (one HIV/HBV, one HBV/HCV). Three HIV-infected and three HCV-infected individuals, all males from Africa, were also serologically HBV-exposed.

Table 4 shows the bivariate association between socio-demographic characteristics and screening tests results. Higher mean age was statistically associated with TPHA, HIV-Ab and HCV-Ab positivity. The geographic origin was statistically significant only for HIV infection. No predictive factors were found to be associated with HBV infection. For all screening tests performed, no statistically significant differences were found for education, civil status, occupation in the birth country, tobacco and alcohol consumption.

Discussion

Main finding of this study

The present study analyses data from the IHCF of the ASC of Castelnuovo di Porto (Rome, Italy) during a 1-year period. Our study population consisted of young and generally healthy migrants, as previously found in other studies.[6,9,10] In Italy, there are no guidelines related to ASs health, thus their medical examination and infectious diseases screening (including TB) is not mandatory, but only recommended. During the study period, 68.8% of hosted ASs requested a medical examination, mostly in the first 3 months after their arrival at the ASC. In order to monitor compliance and side effects of prescribed therapies,[11,12] a DOT approach was applied.

The main diagnoses identified were diseases of respiratory system (26.3%) and symptoms/signs not elsewhere classified (11.9%). Infectious and parasitic diseases accounted for 9.5% of the diagnoses, the most frequent infections were: dermatologic ($n = 107/269$, 39.8%) and enteric ($n = 75/269$, 27.9%), with 55% of the latest ($n = 41/75$) relating to an incidental food contamination. Table 5 compares the main ICD diagnostic groups observed in our study with those observed in other studies on ASs from Malta[10] and Switzerland.[13,14] The main diagnoses differences observed could be related to population diversity, climatic condition of the host countries, but also to the different organization of ASs reception systems. In the Maltese study,[10] 85% of ASs came from East Africa (13% in our population), while in the Swiss study,[13,14] 50% were from Eastern Europe (absent in our study). The vast majority of ASs hosted in Castelnuovo di Porto and in Malta ASCs reached the two countries through the Mediterranean Sea after a long journey. The ASC of the present study, although large, was overcrowded, while the ASCs of Maltese and Swiss studies were significantly smaller. This may explain the higher prevalence of respiratory diseases in our study. Moreover, ASs reaching Italy by sea were referred to the Castelnuovo di Porto ASC after a few weeks spent in reception centres where primary care was available, including treatment of dermatological disorders related to their travel conditions—this could justify the higher prevalence of dermatologic disorders of the Maltese[10] and Swiss[13] studies. According to ICD-10 classification, 'symptoms/signs not elsewhere classified' were significantly prevalent in our and in the Maltese study (6.8%),[10] but not in the Swiss study.[13] This difference could be explained by the longer follow-up of the Swiss study (3 years) that probably has facilitated a more appropriate diagnosis. The excess of 'symptoms/signs not elsewhere classified' in our population compared with the Maltese study could be linked to a weaker cultural mediation service, which may have exacerbated post-migratory difficulties and hampered the change of unhealthy lifestyles (i.e. tobacco/alcohol consumption)[15] that were associated with different ICD-10 diagnostic groups (Table 3).

We reported a 0.2% prevalence of active TB disease and no secondary cases were detected through the consequent surveillance activities performed. The TB prevalence was higher,

Table 3 Multiple logistic regression analysis of predictive factors for ICD-10 diagnosis ($n = 2843$) in ASs ($n = 792$)

ICD-10 group	*Continent: Africa versus Asia*		*Gender: female versus Male*		*Age: OR for +1 year of age*		*Education: yes versus no*		*Marital status: married versus unmarried*		*Tobacco (daily)[a]: no versus yes*		*Alcohol (≥1 alcoholic unit/day)[a]: no versus yes*	
	OR (CI)	P-*value*	*OR (CI)*	P-*value*	*OR (CI)*	P-*value*	*OR (CI)*	P-*value*	*OR (CI)*	P-*value*	*OR (CI)*	P-*value*	*OR (CI)*	P-*value*
Infectious and parasitic diseases	1.8 (1.45–2.44)	0.02	0.38 (0.16–0.87)	0.02	1.0 (0.95–1.04)	0.9	0.86 (0.32–2.28)	0.7	0.99 (0.51–1.92)	0.9	0.72 (0.23–3.88)	0.2	0.85 (0.4–1.79)	0.6
Diseases of the circulatory (and of the blood) system[b]	4.3 (1.1–16.73)	0.03	1.87 (0.55–6.32)	0.3	1.4 (1.2–2.08)	0.03	2.19 (0.34–14.1)	0.4	1.93 (0.71–5.26)	0.2	0.24 (0.13–0.73)	0.01	1.63 (0.32–8.45)	0.6
Diseases of digestive system	1.31 (0.83–2.06)	0.2	0.73 (0.41–1.31)	0.3	1.01 (0.97–1.04)	0.7	1.45 (0.68–3.09)	0.3	0.84 (0.52–1.35)	0.5	0.98 (0.47–1.13)	0.2	0.43 (0.21–0.85)	0.01
Diseases of the ear	0.27 (0.04–1.59)	0.1	1.18 (0.13–10.3)	0.9	0.99 (0.88–1.13)	0.9	3.17 (0.23–44.1)	0.4	0.45 (0.08–2.38)	0.3	2.96 (0.54–16.3)	0.2	0.53 (0.12–2.22)	0.4
Diseases of the eye and annexa	1.93 (0.82–4.53)	0.1	0.39 (0.12–1.28)	0.1	1.06 (0.99–1.13)	0.1	3.43 (0.66–17.8)	0.1	0.56 (0.21–1.49)	0.2	0.94 (0.37–2.34)	0.9	1.47 (0.42–5.14)	0.5
Diseases of the genitourinary system	1.4 (0.59–3.33)	0.4	2.79 (1.14–6.86)	0.02	1.01 (0.96–1.06)	0.8	0.63 (0.18–2.17)	0.4	0.34 (0.19–0.82)	0.04	0.78 (0.34–1.79)	0.5	0.73 (0.27–1.94)	0.5
Diseases of the musculoskeletal system	1.08 (0.63–1.83)	0.7	0.29 (0.12–0.69)	<0.01	0.95 (0.91–1.78)	0.09	0.32 (0.12–1.85)	0.2	2.52 (0.36–4.64)	0.6	1.67 (0.9–3.08)	0.1	0.43 (0.17–0.76)	0.02
Diseases of the nervous system	0.95 (0.51–1.78)	0.8	2.31 (1.09–4.88)	0.03	1.01 (0.96–1.06)	0.6	0.51 0.19–1.37)	0.1	0.67 (0.37–1.23)	0.1	0.55 (0.29–1.02)	0.1	0.43 (0.18–0.72)	<0.01
Diseases of the respiratory system	1.15 (0.81–1.64)	0.4	0.72 (0.46–0.95)	0.02	0.97 (0.95–1.0)	0.07	0.81 (0.45–1.46)	0.4	0.83 (0.57–1.22)	0.3	0.44 (0.16–0.85)	0.01	1.06 (0.67–1.69)	0.7
Diseases of the skin and subcutaneous tissue	1.68 (0.87–3.23)	0.1	0.63 (0.26–1.52)	0.3	0.75 (0.5–0.89)	0.02	1.37 (0.44–4.28)	0.5	2.05 (0.78–4.06)	0.3	2.31 (0.12–4.75)	0.4	1.47 (0.22–3.01)	0.4
External causes of diseases (+ injuries and poisoning)[b]	1.02 (0.56–1.84)	0.9	0.63 (0.3–0.84)	0.02	1.07 (1.03–1.12)	<0.01	2.08 (0.72–5.97)	0.1	0.81 (0.44–1.52)	0.5	1.32 (0.71–2.45)	0.3	0.61 (0.31–1.19)	0.1
Pregnancy, childbirth and the puerperium	1.12 (1.03–1.43)	0.01	n.a	n.a	1.02 (0.95–1.09)	0.5	0.54 (0.18–0.43)	0.03	2.34 (0.96–5.73)	0.06	3.33 (0.97–11.4)	0.06	0.16 (0.05–1.47)	0.3
Symptoms/signs not elsewhere classified	0.81 (0.48–1.37)	0.4	1.36 (0.76–2.45)	0.3	1.01 (0.97–1.04)	0.7	1.4 (0.63–3.14)	0.4	0.87 (0.53–1.43)	0.6	0.94 (0.56–1.58)	0.8	0.72 (0.4–1.31)	0.3

n.a., not applicable.

[a]Data only on adult ASs ($n = 729$).

[b]Note: In order to perform the multiple logistic regression analysis, we aggregated the 'Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism' with the 'Diseases of the circulatory system', the 'External causes of morbidity and mortality' with the 'Injury, poisoning and certain other consequences of external causes' and we excluded from this analysis the two neoplasm diagnosis. Furthermore, we excluded from the analysis the three Latin Americans migrants because of their small number.

Table 4 Bivariate association between socio-demographic characteristics of adult (≥18 years) ASs and results of the screening tests ($n = 347$)

Variables	*TPHA*			*HIV-Ab*			*HBsAg*			*Hbs-Ab*			*HCV-Ab*		
	Pos, n *(%)*	*Neg,* n *(%)*	P-*value*	*Pos,* n *(%)*	*Neg,* n *(%)*	P-*value*	*Pos,* n *(%)*	*Neg,* n *(%)*	P-*value*	*Pos,* n *(%)*	*Neg,* n *(%)*	P-*value*	*Pos,* n *(%)*	*Neg,* n *(%)*	P-*value*
Continent[a]															
Africa	6 (6.1)	93 (93.9)	0.4	11 (5.2)	199 (94.8)	0.02	25 (11.3)	196 (88.7)	0.2	47 (21.7)	170 (78.3)	0.6	5 (2.3)	209 (97.7)	0.1
Asia	1 (2.9)	33 (97.1)		0 (0)	99 (100)		8 (7.3)	102 (92.7)		23 (20.9)	87 (79.1)		6 (5.7)	100 (94.3)	
Gender															
Male	7 (6.7)	98 (93.3)	0.1	5 (2.1)	236 (97.9)	0.1	28 (10.7)	234 (89.3)	0.3	60 (23.1)	200 (76.9)	0.1	9 (3.5)	245 (96.5)	0.8
Female	0 (0)	30 (100)		6 (8.6)	64 (91.4)		5 (6.9)	67 (93.1)		10 (14.3)	60 (85.7)		2 (2.9)	66 (97.1)	
Mean age (± SD)	38.9 ± 10.4	30.7 ± 8	<0.01	40.1 ± 5.9	29 ± 7.3	<0.01	27.7 ± 6.7	29.7 ± 7.7	0.1	28.3 ± 6.8	29.8 ± 7.7	0.1	36 ± 12.4	29.3 ± 7.5	<0.01
Education															
Yes	5 (5.9)	80 (94.1)	0.6	7 (3.9)	174 (96.1)	0.9	17 (8.7)	178 (91.3)	0.3	31 (19.7)	155 (80.3)	0.5	7 (3.7)	180 (9.3)	0.3
No	0 (0)	3 (100)		1 (4.2)	23 (95.8)		4 (14.8)	23 (85.2)		4 (14.8)	23 (85.2)		0 (0)	27 (100)	
Mean years (± SD)	9.3 ± 6.6	8 ± 5.2	0.5	7.8 ± 6.4	7.8 ± 5.2	0.9	6.7 ± 5.5	7.8 ± 5.2	0.1	7.2 ± 5.3	7.8 ± 5.2	0.3	7.5 ± 6.2	7.8 ± 5.2	0.8
Marital status															
Married	4 (7.8)	47 (92.2)	0.3	7 (6.8)	96 (93.2)	0.08	9 (8.2)	101 (91.8)	0.3	18 (17.1)	87 (82.9)	0.3	4 (3.7)	104 (96.3)	0.9
Unmarried	3 (3.9)	75 (96.1)		4 (2.5)	158 (97.5)		21 (11.9)	156 (88.1)		38 (21.4)	140 (78.6)		6 (3.5)	166 (96.5)	
Occupation															
Farmer	0 (0)	13 (100)	0.4	1 (4.2)	23 (95.8)	0.2	4 (16.7)	20 (83.3)	0.2	7 (29.2)	17 (70.8)	0.2	2 (8.3)	22 (91.7)	0.6
Craftsmen	1 (3.7)	26 (96.3)		0 (0)	58 (100)		9 (13.5)	56 (86.5)		11 (16.9)	54 (83.1)		1 (1.6)	63 (98.4)	
Professional	1 (33.3)	2 (66.7)		0 (0)	8 (100)		0 (0)	8 (100)		1 (14.3)	6 (85.7)		0 (0)	8 (100)	
Student	0 (0)	8 (100)		1 (4)	24 (96)		5 (17.9)	23 (82.1)		2 (7.4)	25 (92.6)		1 (3.7)	26 (96.3)	
Public employee	1 (.83)	11 (91.7)		1 (4)	24 (96)		1 (2.9)	25 (96.1)		8 (30.8)	18 (69.2)		1 (3.5)	25 (96.5)	
Trader	2 (6.9)	27 (93.1)		6 (10)	54 (90)		3 (4.8)	59 (95.2)		11 (18)	50 (82)		4 (6.7)	56 (93.3)	
Unemployed	1 (5.9)	16 (94.1)		2 (5)	38 (95)		4 (9.1)	40 (90.9)		11 (25.6)	32 (74.4)		1 (2.4)	41 (97.6)	
Tobacco															
Yes	2 (8.3)	22 (91.7)	0.5	3 (3.1)	95 (96.9)	0.9	9 (8.2)	191 (91.8)	0.6	24 (22.4)	83 (77.6)	0.06	2 (1.9)	106 (98.1)	0.7
No	1 (16.7)	5 (83.3)		1 (2.8)	35 (97.2)		2 (5.6)	34 (94.4)		3 (8.3)	33 (91.7)		1 (2.8)	35 (97.2)	
Alcohol															
Yes	1 (4.4)	22 (95.6)	0.06	4 (3.3)	116 (96.7)	0.4	11 (8.4)	119 (91.5)	0.2	25 (19.5)	103 (80.5)	0.9	3 (2.3)	127 (97.7)	0.5
No	2 (28.6)	5 (71.4)		0 (0)	14 (100)		0 (0)	16 (100)		2 (20)	12 (80)		0 (0)	14 (100)	

[a]Note: We excluded from the bivariate analysis the three Latin Americans ASs because of their small number.

Table 5 Comparison of observed main ICD diagnostic groups with studies on ASs from Malta and Switzerland (psychiatric disorders not included)

ICD-10 diagnostic group	*Present study (n = 2843)*	*Maltese study[10] a (n = 3634)*	*Swiss study[13] (n = 845)*
Diseases of the respiratory system	26.3% (*n* = 747)	20.3% (*n* = 739)	16.3% (*n* = 138)
Symptoms, signs not elsewhere classified	11.9% (*n* = 340)	6.8% (*n* = 247)	n.a.
Diseases of the digestive system	11.6% (*n* = 331)	14.7% (*n* = 533)	n.a.
Certain infectious and parasitic diseases	9.5% (*n* = 269)	4.7% (*n* = 171)	7.3% (*n* = 62)
Diseases of the musculoskeletal system and connective tissue	9.3% (*n* = 264)	7.6% (*n* = 278)	16.8% (*n* = 142)
Injury, poisoning and certain other consequences of external causes	6.5% (*n* = 185)	9.5% (*n* = 346)	9.9% (*n* = 84)
Diseases of the skin and subcutaneous tissue	5.5% (*n* = 157)	20.7% (*n* = 752)	10.2% (*n* = 86)

n.a., not available.

[a]Data from this study were originally based on ICD-9 classification and have been re-elaborated according to ICD-10 diagnostic groups in order to be comparable with the other two studies.

compared with the Maltese study (0.004%)[10] and lower than an Italian study on ASs (0.8%) based on active screening approach.[16] No malaria cases were found. Overall, 56 active infectious diseases (2% of total diagnoses reported) were detected through the voluntary screening. HBV infection prevalence in African groups was similar to that reported in the literature,[17] including studies on ASs.[18,19]

Based on their ages and year of vaccine introduction into their birth countries, none of screened ASs could have received a routine childhood HBV-vaccination.[20] One out of three screened participants had a serologic pattern of HBV-infection/exposure, confirming a high viral circulation in their birth countries.[17] An immunization policy for HBV infection among ASs is a public health need. HCV seroprevalence in the African group of participants was similar to that observed in a systematic review on global HCV burden,[21] but different from that described in other studies on African ASs in Italy (4.3%)[18] and Malta (0.6%).[19] The HBV and HCV seroprevalence on Asian ASs were higher than that reported in large systematic reviews.[17,21] The HIV prevalence was slightly higher than that from other studies on ASs,[18,22] but no opportunistic infections were recorded. The observed prevalence of syphilis (latent/active) confirmed a significant spread in our study population. The bivariate analysis performed, looking for an association between socio-demographic characteristics and screening results, showed a statistically significant association of the mean age with TPHA, HIV and HCV positivity and of the African origin with HIV infection, while no associations were found for HBV-infection/exposure.

What is already known on this topic

The number of ASs has increased over the most recent years[1–3] and, although the vast majority is hosted in developing countries,[1,2] are increasingly those who try to reach EU countries to seek asylum. Healthcare services for ASs in EU countries appear not to be homogeneous and are often based on minimum standards.[23] Data on ASs communicable diseases burden are heterogeneous.[24] Available studies on ASs are mainly oriented on infectious diseases burden and only a few focused on their global health profile. ASs are a vulnerable population because of the push factors (conflicts, tortures, abuses, etc.) of their migration process[23,25–27] and published data on their health status are limited.[15] Social diversity, language barriers and cultural beliefs (including health-related)[6] may influence the acceptance of preventive care, such as screening[28] and post-migration difficulties (i.e. uncertainty of their status, length of asylum procedure, aftermaths of conflicts, etc.) may be responsible of an over-request of healthcare assistance.[29,30]

What this study adds

The present study provides a comprehensive picture of the health profile and independent diseases' predictors among ASs living in a big ASC in Italy, where data are limited. Our AS population was affected by diseases related to environmental factors (i.e. poor hygiene and overcrowding living conditions) as respiratory (i.e. acute infections) and infectious diseases (i.e. enteritis, skin infections). The observed excess of non-specific physical symptoms/signs could be related to a short observation period and/or to post-migratory difficulties. Concerning screened infectious diseases, their prevalence was mainly related to birth countries. Thus, we think that interventions should be implemented in ASC in order to: (i) improve reception systems (i.e. avoiding overcrowding living conditions); (ii) strengthen cultural mediation support to mitigate the impact of post-migration factors on health status and promote a proper use of healthcare facilities; (iii) facilitate voluntary screening of infectious diseases endemic in birth countries to preserve individual and public health; (iv) promote

health awareness and prevention (i.e. immunization) campaigns tailored to different AS cultures. Finally, we wish for a coherent social–legal and health approach among EU countries tailored on AS health needs, along with recognized professional training for cultural mediators strengthening their ability to support the migrant and health personnel.

Limitations of this study

Our study has some limitations. The lack of systematic cultural mediation support could have caused a reduced diagnostic accuracy because of language barriers. Moreover, we have not considered psychiatric disorders because they have been managed outside the IHCF by an external team of specialists. Also, psychiatric examinations were not recorded, excluding a possible comparison with our data. Finally, for the infectious diseases detected by voluntary screening, we cannot establish the timing of infection.

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Authorship

G.R.: conception and design of the study; data acquisition, analysis and interpretation; drafting the article. S.V.: conception of the study; data acquisition and interpretation; drafting the article. A.M.: data analysis and interpretation; drafting the article. N.T.: revision of the article. A.S.: conception and design of the study; data interpretation; revision of the article. V.V.: conception of the study; data interpretation; revision of the article. All authors have approved the different study steps and the final article submitted.

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