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Emergency Department as an epidemiological observatory of Human Mobility: the experience of the Moroccan population

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Abstract

We conducted a retrospective study of the accesses to the Emergency Department registered from January 2000 to December 2014 in 5 major hospitals in the Metropolitan Area of Rome. We extrapolated data relating to patients of Moroccan origin from about 5 million

total accesses, so we compared with Italians data which, in the same period, came to ED.
The Moroccan population is distinguished by a larger number of diagnoses belonging to the ICD-9 code of Infectious Diseases and, more precisely, to Respiratory Infectious Diseases. There are also no differences in the assignment of such diagnoses to Moroccans with Italian citizenship, and this led to think that this could play an important role in the use of the ED and moreover that enrollment to the National Health Service may reduce its inappropriate use.
Regarding to Degenerative Disorders, the result of our analysis is quite emblematic, showing that the accesses to the ED is due to Cardiovascular Diseases: 6.33% of Italians' accesses against 1.81% of Moroccans and 2.36% of Moroccans with Italian citizenship. The main explanation for this difference is, obviously, due to the age of the population: about 60% of Moroccans who accessed to ED was less than 40 years old.
It is interesting how, in the field of Cardiovascular Diseases, Moroccans have a lower percentage of diagnosis compared to Italians for acute diseases and a greater percentage of diagnoses for chronic diseases, suggesting once again that accesses to ED for migrants often is due to the inability to use the general services of the National Health Service.
In conclusion, from the point of view of the Emergency Department, Migration Medicine still has Infectious Diseases as the main reason for access. Degenerative Disorders remain a prerogative of the Italians, but we could certainly assume that the Moroccan population would develop at some point with the aging.

Introduction

The problem of migratory flow of people is very ancient, and processes due to globalization and/or political issues led to new kind of human mobility.
This contributes to shift social and economic inequalities, within the countries that host migrants, increasing the burdens deriving from their needs.
We can consider Emergency Departments (EDs) as privileged observers of population health needs which reside or pass in a given area: people who cannot access to other facilities address to ED because it is the only Healthcare Facility avaiable 24-hours a day, including holidays, either for administrative issues, because ED takes care of all patients who access, even if not enrolled in the National Health Service. These characteristics are particularly related to the migrant population, people often in need and without alternatives. ED thus becomes the only traceability tool for people who otherwise would not leave any sign, having actually no economic resources, residence or even identity card. This is true also from a chronological point of view, since we can observe the variation over time of Health needs of a given population.
To this aim, we conducted a retrospective study of the accesses to Rome metropolitan area EDs, from January 2000 to December 2014. After having generally studied the North African population facing the Mediterranean basin (ITJEM n.1/18), we are going now to document specific data about Morocco population and their peculiarities.

Demographic and health characteristics of Moroccans in Italy and in Rome

The Moroccan community appears since the 70's, among the main protagonists of the migration phenomenon in Italy, also due to the geographical proximity of the countries.
Migration numbers have constantly grown up, leading the Morrocans to stand among the first three populations of immigrants residing. [1]
The latest ISTAT data, relating to Moroccan migrants present in the Italian territory until the 1st January 2015, reported 518,357 people (55.4% men and 44.6% women), equal to 13.2% of all non-EU citizens. The main reason to explain these numbers could be the "reunification with the family" (66% of total), instead the number of new entrants seems decreasing.
Furthermore, the number of Moroccans who have acquired Italian citizenship increased (29,025 in 2014, +14% compared to the previous year). This has a substitute effect: the number of non-EU citizens decreases in favor of "new" Italian citizens of foreign origin.
In 2015, the average age was 30 yo. Altogether almost half of Moroccan citizens was <30 yo (46% of total), while 14% was >50 yo. 71.7% of Moroccans live in the northern regions, 13.95% in the southern ones and 14.3% in the central Italy.
In Lazio reside at least 3% of Moroccans, the largest part of which in Rome and itsprovince: on 1st January 2015 the numbers were 13,336 people, with a growth of +4.1% compared to the 2014. 62.6% of these live in Rome. [2.3.4.5.6]
The diseases that affect the Moroccan community in Europe, according to the scientific literature, are those ones related to cardio and cerebrovascular systems. Related risk factors are hypertension [7,8], obesity [9,10,11], diabetes [12,13,14]; the same widespread in both the countries, origin and residence.

Aim of the study

This study assesses the health status of a Mediterranean basin population next to Italy, quite numerous because of its migratory flow, in order to record any peculiarities and possible changes in health status over the years, compared to Italian ones.

This population was chosen because of the above characteristics and the relative stable residency and inclusion in our social context. Emergency Department was also chosen as an observatory tool, even if very unusual for such studies.

Materials and methods

We conducted a retrospective study on patients who referred to the Emergency Department of five hospitals in the Rome metropolitan area: Policlinic Umberto I, Policlinic Tor Vergata, San Camillo Forlanini Hospital, San Giovanni Addolorata Hospital, Sandro Pertini Hospital.
We examined the ED accesses from January 2000 to December 2014. Each access is registered by the GIPSE computer system (which records the activities in ED and collects data requested from Lazio Region) in which patient information is entered, together with the reason of admission, the relative priority code and the clinical outcome: discharge, hospitalization, transfer to another hospital or death.
Furthermore, it collects useful information about health status of the population.
We extrapolated patients from Morocco from approximately 5,000,000 accesses recorded during the 14 years of the study, noting age, gender, reason access and final diagnosis identified according to the international classification of diseases (ICD-9 CM: International Classification of Diseases-9th revision-Clinical Modification).
We compared the prevalence of this information with the one of the Italians, the majority of the citizens who, during the period of the study, came to the Emergency Department of the five Roman hospitals. Some data relating to the natives of Morocco were compared with those relating to other populations in North Africa.

Statistical analysis

Statistical analysis was performed using the Chi-square Test to compare the different citizenships total infections and respiratory infections with their relative hospitalization. All tests were performed in two study-arms. Poisson regression models were constructed to identify variables independently associated.
The variable “Citizenship” (0 = Italian citizens, 1 = Moroccan citizens, 2 = Italian citizens born in Morocco) was treated as a “dummy” variable, using Italian citizenship as a reference (0).
The following variables have also been added: “gender” (0 = female; 1 = male); “age” (continuous v.); “2000-2014 time interval” (continuous v.), “triage code assigned to access“ (categorical v.) and “outcome” (categorical v.). A value of p less than 0.05 was considered significant.
The tests were performed using the Stata 15 software (Statacorp LP, 4905 Lakeway Drive College Station, Texas 7784 USA).

Results

Figure 1 shows the data related to all the accesses in the five Emergency Departments object of the study, in the period 2000-2014.
We have only considered and compared the data related to the accesses of Italians and Moroccans.
The analysis of the data showed 4,574,571 accesses in the ED; of these, 4,556,593 refer to Italian citizens, 15,693 to Moroccan citizens and 2,285 to Moroccans with Italian citizenship. The trend shows a constant increase in accesses by Moroccan citizens from 2000 to 2014 with a peak in 2013 of 1,476 accesses (Figure 2).
The Moroccan population examined in our data is mainly represented by male immigrants (62.4%) and the average age of the population was 33 years. Only 3.46% was more than 60 years (against 28.17% of Italians), while 12% were less than 18 years old (Figure 3).
The diagnoses assigned to Moroccan discharged, from 2000 to 2014, were grouped according to the diagnostic codes of the ICD-9-CM and were compared with those of the Italians and Moroccans who have obtained Italian citizenship.
The most frequent causes of ED access for Moroccan citizens were: Traumatism and Poisoning 30.78% (ICD-9-CM 800-999); Ill-defined signs and symptoms 19.19% (ICD-9-CM 780-799); Nervous System and Sense Organs Diseases 8.16% (ICD 320-389); Respiratory System Diseases 8.1% (ICD-9-CM 460-519); Infectious Diseases 7.72%.
In the context of the ICD diagnoses we have particularly considered the infectious diseases and the subgroup of respiratory infectious diseases (which were the most numerous), because in these groups significant differences between the Moroccan and Italian population appeared.
Diagnoses related to other ICD-9 categories do not find particular differences from those related to the Italian population (Figure 4).

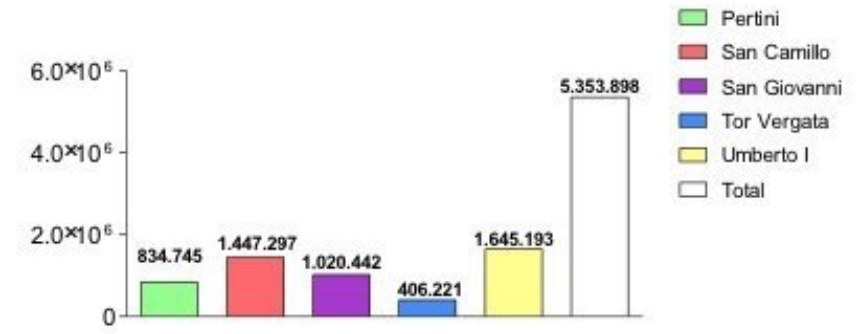
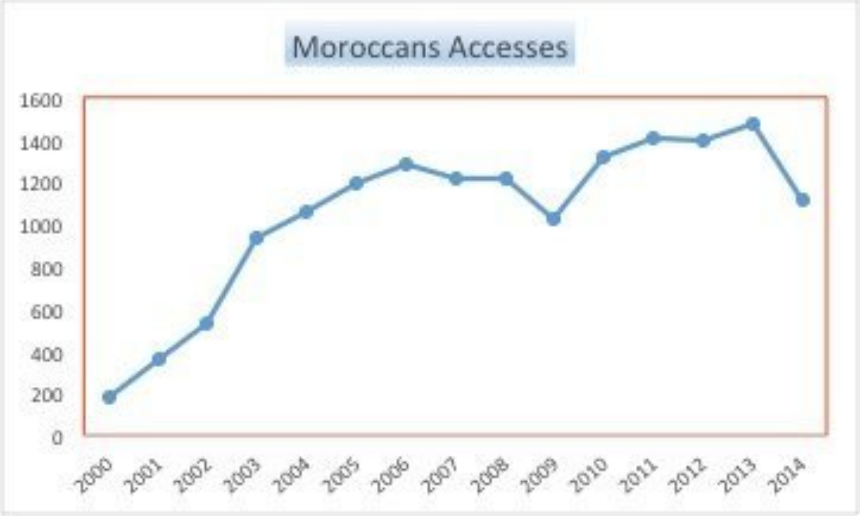


Figure 1



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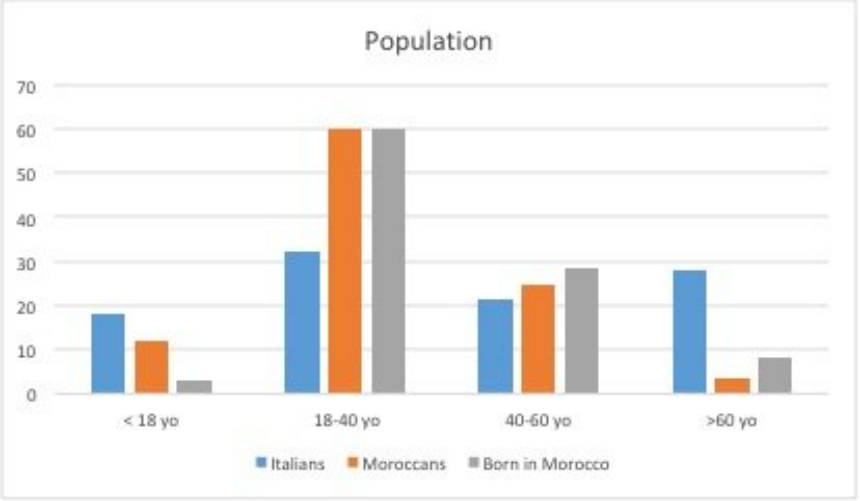

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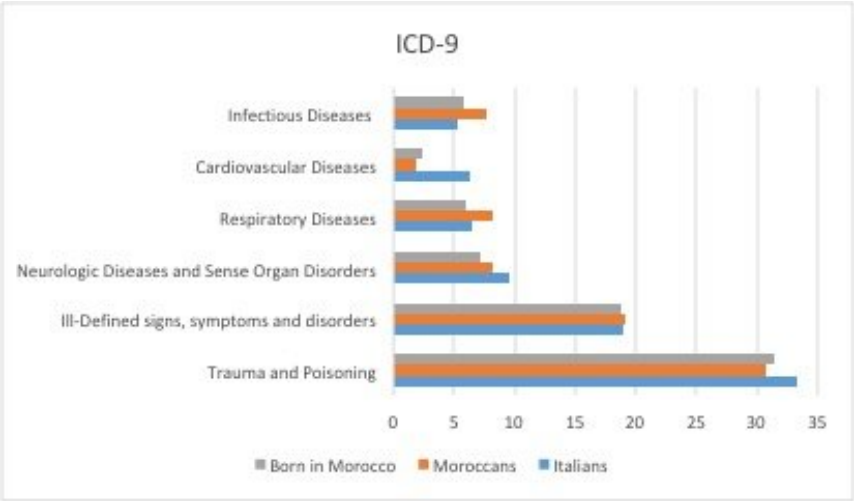

Figure 4

Infectious diseases

This group of diagnoses includes diseases of infectious origin of the various classes ICD-9 with a total of 244,779, which 243,568 were Italians, 1,211 Moroccans and 133 Moroccans with Italian citizenship.

With the Chi-square Test a statistically significant difference was observed in the accesses that hesitate in diagnoses of this category in the comparison between Italians and Moroccans (5.3% vs 7.7%, p <0.001) and between Moroccans and Moroccans with Italian citizenship (7.7% vs. 5.8%, p <0.001), but not between Italians and Moroccans with Italian citizenship (5.3% vs. 5.8%, p = 0.313) (Table 1).

The Poisson Regression indicated that both the Moroccan nationality (IRR: 1.27; CI 95% 1.20-1.34, p <0.001) and the Moroccan origin of Italian citizens born in Morocco (IRR: 1.34; CI 95%: 1.13- 1.59, p <0.001) are independently associated with a greater risk of having assigned a diagnosis within this category. The same is true for the female gender (IRR: 0.94; CI 95%: 0.93-0.94, p <0.001), while the risk decreases with increasing age (IRR: 0.96; CI 95%: 0.96- 0.96; p <0.001).

	Italians N° (%)	Moroccans N° (%)	Moroccans with Italian citizenship N° (%)	Pv
Infectious Diseases	243.568 (5.35)	1.211 (7.72)	-	**0.000**
	-	1.211 (7.72)	133 (5.82)	**0.001**
	243.568 (5.35)	-	133 (5.82)	0.313
Hospital Admissions	55.578 (22.82)	207 (17.09)	-	**0.000**
	-	207 (17.09)	26 (19.55)	0.478
	55.578 (22.82)	-	26 (19.55)	0.369
Respiratory Infectious Diseases	186.865 (4.10)	913 (5.82)	-	**0.000**
	-	913 (5.82)	79 (3.46)	**0.000**
	186.865 (4.10)	-	79 (3.46)	0.121
Hospital Admissions	43.894 (23.49)	155 (16.98)	.	**0.000**
	-	155 (16.98)	10 (12.66)	0.3231

	43.894 (23.49)	-	10 (12.66)	**0.023**

Table 1

Respiratory infectious diseases

The diagnosis of "Respiratory Infectious Diseases" were a total of 187,857, of which 186,865 for Italians, 913 for Moroccans and 79 for Moroccans with Italian citizenship.
The Chi-square Test showed that there were statistically significant differences in the comparison between Italians and Moroccans (4.1% vs 5.8%, p <0.001), between Moroccans and Moroccans with Italian citizenship (5.8% vs 3.4%, p <0.001) , but not between Italians and Moroccans with Italian citizenship (4.1% vs. 3.4%, p = 0.121) (Table 1).
The Poisson Regression showed that Moroccan nationality (IRR: 1.26; CI 95%: 1.18-1.34, p <0.001), but not the Moroccan origin (IRR: 1.13; CI 95%: 0.90-1.40, p = 0.289), is associated with a greater risk of having assigned a diagnosis belonging to this category.
Moreover, the risk is higher in the male gender (IRR 1.08; CI 95%: 1.07-1.09, p <0.001), while it decreases with increasing age (IRR: 0.96; CI 95%: 0.96-0.96, p <0.001).
The admissions for Respiratory Infectious Diseases were 44,059, of which 43.894 of Italians, 155 of Moroccans and 10 of Moroccans with Italian citizenship.
The Chi-square Test showed statistically significant differences between Italians and Moroccans (23.5% vs. 17%, p <0.001), between Italians and Moroccans with Italian citizenship (23.5% vs. 12.7%, p = 0.023), but not among Moroccans and Moroccans with Italian citizenship (17% vs. 12.7%, p = 0.323) (Table 1).
The Poisson Regression did not show a statistically significant association between Moroccan nationality (IRR: 0.99; CI 95%: 0.84-1.15, p = 0.854) or the Moroccan origin of Italian citizens (IRR: 0.73; 95% CI: 0.39-1.35, p = 0.312) and the risk of hospitalization for respiratory infectious diseases. This risk is greater with age (IRR: 1.02, CI 95%: 1.02-1.02, p <0.001) and with male gender (IRR: 1.10; CI 95%: 1.08-1.12, p <0.001) .

Cardiovascular diseases

The diagnoses of Cardiovascular Diseases were 6.3% for Italians, 1.8% for Moroccans and 2.4% for Moroccans with Italian citizenship (Figure 4).
These data were evaluated using a different statistical method: a descriptive analysis.
Within this ICD-9 category, Italians and Moroccans have been compared with the populations of North Africa (i.e. Algerians, Egyptians, Libyans and Tunisians), which shared geographical proximity and young age, and four diagnostic groups were found: acute and chronic cardiovascular diseases and acute and chronic cerebrovascular diseases. In particular, acute cerebrovascular diseases had a higher rate of diagnosis for all six populations (57.8%), followed by acute (31.4%) and chronic cardiovascular diseases (8.2%) and finally by chronic cerebrovascular diseases (7.6%). Italians had a higher rate of diagnosis of acute cardiovascular diseases (32.4%) than almost all other populations examined (Algerians 25.9% vs Egyptians 42.7% vs Libyans 28.8% vs Moroccans 27.4% vs Tunisians 31.4%).
The same was true for acute cerebrovascular diseases with 57.2% for Italians, 51.8% for Algerians, 44% for Egyptians, 58.6% for Libyans, 52% for Moroccans and 52.9% for the Tunisians. As for chronic diseases, Italians had a lower percentage of diagnosis compared to almost all other populations, both in relation to cardiovascular diseases (Italians 6.6% vs Algerians 11.4% vs Egyptians 7.3% vs Libyans 5.6% vs Moroccans 8.2% vs Tunisian 10.5%) and cerebrovascular diseases (Italians 3.8% vs Algerians 11.1% vs Egyptians 6% vs Libyans 7% vs Moroccans 12.3% vs Tunisians 5.2%) (Figure 5).

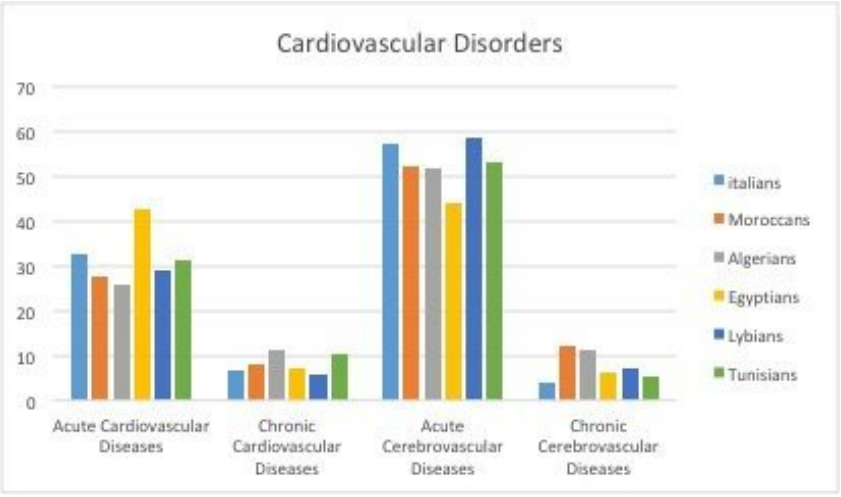

Figure 5

Discussion and conclusion

In the last years, the theme of migration medicine has undergone an evolution that has brought to light chronic pathologies as the main threats to the health status [20, 21, 22]. This would be particularly in accordance with the "Phenomenon of Westernization", in which immigrants would adapt to the lifestyle of the host population, acquiring risky habits and pathologies typical of Western countries, and would go to deny the most classical view of the Medicine of Migration, which sees infectious diseases as the main threat to public health [15, 16, 17, 18, 19]. With such premises, corroborated by the intrinsic risk factors of the Moroccan population, such as hypertension [7, 8], obesity [9, 10, 11] and diabetes [12, 13, 14], one would have expected to find as main causes of access in the Emergency Department, the degenerative diseases, described however, as the main cause of mortality and morbidity of the Moroccan population [23, 24, 25, 26, 27, 28, 29, 30].

In fact, according to our analysis, infectious diseases have shown the main differences between the migrant population and the host population.

The Moroccan population differs from the Italian one for a larger number of diagnoses belonging to ICD-9 codes “Infectious Diseases” and the subgroup “Respiratory Infectious Diseases” mostly.

But considering admissions, we see that Italians are more frequently admitted on the other hand. This could be explained because of a more vulnerability of Italian population to complications, because is older than the Moroccan one, and even because of the improper use of the ED by the host population, usually not enrolled in the National Health Service, and so more frequently and improperly addressed hospitals rather than to general practitioner or other medical services, for diseases that do not require emergency treatment at all. [31]

This would be confirmed by the fact that the Moroccans with Italian citizenship do not differ from the Italians for the diagnosis of Infectious and Respiratory Infectious Diseases, suggesting that they have become homogeneous to the host population (even with Health Care System alignment).

Regarding the degenerative pathologies, the result of our analysis that illustrates the accesses to the ED for “Cardiovascular Diseases” is emblematic: 6.33% of Italians' accesses against 1.81% of Moroccans and 2.36% of Moroccans with Italian citizenship. The main explanation for this difference is, obviously, due to the age: therefore about 60% of Moroccans who have accessed to ED is less than 40 years old.

It is interesting to observe that, within the field of circulatory system diseases, almost all the populations of North Africa, including the Moroccans, had a lower percentage of diagnosis compared to the Italians for acute diseases and instead a greater percentage for chronic ones, suggesting once again that accesses to the ED by migrant populations often is inappropriate. Italians had a lower percentage of accesses because of chronic diseases, because they could rely on National Health Service.

In conclusion, from the perspective of the Emergency Department, Migration Medicine still has infectious diseases as its main topic. Degenerative diseases remain instead the prerogative of Italians while, regarding the Moroccan population, they are more likely to show it up with the aging, because of that “phenomenon of westernization” which is nevertheless not yet apparent.

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