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## Original Research

# The burden of chronic noncommunicable diseases in undocumented migrants: a 1-year survey of drugs dispensation by a non-governmental organization in Italy



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## ABSTRACT

**Objectives:** This study was carried out with two objectives. The first one was to have an insight into the prevalence of chronic noncommunicable diseases (CNCD) in undocumented migrants, and the second one was to evaluate if differences existed among different ethnic groups.

**Study design:** The study is based on the collection of data on drug dispensation by a non-governmental organization (NGO) providing free medical assistance to undocumented migrants in Milan, Italy. All the prescriptions to adult subjects from January 1 to December 31 2014 (total 8438) were recorded and analyzed. All the data available for the patients receiving prescriptions (age, gender and country of birth) were also collected in anonymous form. Ethical approval for the study was given by the Ethics Committee of the NGO.

**Methods:** Drugs were grouped according to the anatomical therapeutic chemical (ATC) classification and their quantities expressed as daily defined doses (DDDs)/1000 patients/day. The 56 ATC levels were divided into three groups according to their use for acute, chronic, or both acute and chronic diseases. The statistical analysis of drug dispensation was performed for the whole population and for the five ethnic groups into which it had been divided.

**Results:** Prescription of medicines for chronic conditions was significantly greater than for acute ( $154.2 \pm 45.9$  vs  $51.3 \pm 18.4$  DDD/1000 patients/day,  $P < 0.02$ ) and for both acute and chronic conditions ( $57.9 \pm 12.8$  DDD/1000 patients/day,  $P < 0.02$ ). Five ATC classes accounted for 60% of all chronic prescriptions. They were differently distributed among the

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five ethnic groups (e.g., Asians required more antihypertensives and antidiabetics, East Europeans required more lipid modifying drugs, antihypertensives and antithrombotics). *Conclusions:* Our data show an important use of medicines for chronic diseases in a population of undocumented migrants. Though with some limitations, this could be an indicator of a high prevalence of CNCD in this population, with significant differences among different ethnic groups. This situation should be considered when planning health interventions, also in consideration of the fact that it could have an impact on European Health Services in a short time.

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## Introduction

Data on the health status and health needs of undocumented migrants are scarce and generally limited to subjects seen in the Emergency Department<sup>1,2</sup> or on the field.<sup>3</sup> This is true for Italy and, in general, for all European Union (EU) countries, in spite of the fact that irregular migration to Europe, escaping from war, poverty and religious or political persecution, is continually growing.<sup>4</sup>

Actually, undocumented migrants find many obstacles in obtaining health care with the exception of emergency and primary services, provided free of charge to all by most EU countries.<sup>5</sup>

Many studies have acknowledged for decades the so-called ‘healthy migrant effect’, meaning that foreign-born people have better health status than their native-born counterparts when arriving in the destination country.<sup>6,7</sup> This concept has undergone some criticism. First, it is possible that this difference is lost after some years of permanence in the host country.<sup>8</sup> Second, significant health status differences seem to exist within the migrant population, for example between refugees and labour and education migrants, upon arrival in the host country.<sup>9</sup> Thus, the possibility exists that, on the contrary of what was initially thought, the prevalence of chronic diseases in undocumented migrants is very high. This appears particularly the case for cardiovascular risk factors, as it has been recently pointed out by a consensus document of an ad hoc Working Group of the European Society of Hypertension.<sup>10</sup>

Their status itself might have a negative impact on their health and well-being; moreover, limitations in the access to care could exacerbate their physical and mental illnesses.<sup>11</sup>

These issues are difficult to investigate in the population of undocumented migrants. For these persons, no data are available in public registers and they are difficult to obtain for many reasons (unwillingness to be registered, unavailability of a defined residence, poor adherence to treatments, language barriers, etc). This is reflected in the available literature, which, as previously pointed out, is mainly based either on surveys of emergency health problems<sup>1–3</sup> or on very thorough studies of a very small number of subjects.<sup>11</sup>

These considerations can explain why data on the health conditions and needs of undocumented migrants are so scant in the literature. Therefore, we have tried to obtain a picture of the health status of a large population of undocumented

migrants by assessing the therapies that they receive from a major Italian Charity. This method, which has already been useful in giving us preliminary insights,<sup>12</sup> is especially useful if a clear correlation exists between a given drug (or group of drugs) and a certain disease and when prescriptions are necessary rather than discretionary.<sup>13</sup> It is increasingly used in pharmacoepidemiological studies in different medical settings<sup>14,15</sup> and has recently been employed to evaluate the purchase of medicines by regular migrants in EU countries.<sup>16</sup> In the present study, we used it to carry out a prospective 1-year survey in a population of undocumented migrants receiving medical assistance by a major Charity in Milan, Italy, with two aims. First, we tried to get a measure of the burden of chronic noncommunicable diseases in these subjects; second, we evaluated if race-related differences exist among the various ethnic groups of undocumented migrants.

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## Methods

For this study, we used the data on drug dispensation obtained from the pharmacy of the Opera San Francesco (OSF), a major non-governmental organization (NGO) in Milan, Lombardy (Italy), that provides free health care to undocumented migrants. This is done through the voluntary work of more than 150 doctors representing almost all the medical disciplines, who rotate in the clinics. Thus, each patient is seldom seen twice by the same clinician; this can be a limit, but also prevents the effects of possible differential prescribing. Two outpatient clinics are run all day from Monday to Friday. Patients seek consultations spontaneously. They are first seen by an internist and, when necessary, they are referred to a specialist; at the end of the consultation, they receive for free from the pharmacy of the NGO the drugs that have been prescribed. Occasional low-income Italian natives are also cared for. In our study, their number was too small to be included in the statistical analysis.

All the adult undocumented persons who, during the entire 2014, sought assistance at the OSF and received at least one drug prescription were included.

The population consisted of 8438 (4902 males; 3536 females) adult subjects with a mean age of  $39.5 \pm 12.4$  years (range: 18–70 years).

They were stratified by gender and age, since both could represent confounding factors affecting the use of drugs and

by geographical origin. According to the latter, five groups were identified, coming from five macro areas: Eastern Europe, Latin America, Sub-Saharan Africa, North Africa and Asia (mainly from Central and Southern Asia). No Middle East group was available, since refugees from Syria and confining countries generally do not remain in Italy, being directed to Northern Europe.

The collected data included: anatomical therapeutic chemical (ATC) code of each dispensed drug, number of units dispensed, number of users and population characteristics as specified above.

Drugs were grouped according to the ATC classification and their quantities calculated as daily defined dose (DDD)/1000 patients/day, as suggested by the World Health Organization (WHO).<sup>13</sup> The ATC drug classification system is a widely acknowledged taxonomic method, allowing to overcome the different drug classifications still used in different countries. First introduced in the 1970s by the Norwegian Medicinal Depot, it is now maintained and constantly updated by the WHO Collaborating Centre for Drug Statistic Methodology, established in Oslo in 1982. The WHO itself strongly recommends this classification when studying the use of drugs and their grouping for different purposes. It is based on the hypothesis that compounds with comparable physicochemical properties exhibit identical biological and therapeutic activities. The ATC method allows to define each compound with a unique alphanumeric code based on the organ or system on which it acts and its pharmacological, therapeutic and chemical properties. Such code is a fingerprint which makes each drug individually identifiable. To do so, drugs are assigned to 14 main classes, which are further divided into subcategories, until the single molecule becomes identifiable. The DDD is a unit of measure representing the daily maintenance dose in adults, according to the main therapeutic indication of the drug.<sup>14</sup>

The amount of dermatological products, which lack a DDD, was calculated on the basis of the dispensed units.

Drugs were also classified in three groups: those used to treat chronic conditions (e.g., diabetes and hypertension), those for acute diseases (e.g., drugs for infectious diseases), and those used in both situations (e.g., diuretics).

### Statistical analysis

The SPSS statistical package was used. ANOVA was utilized for parametric data; distribution frequency probabilities were calculated using Chi-square statistics. All data are expressed as mean  $\pm$  SD, or as percentage, as appropriate.

### Ethics

Ethical approval for this work was granted by the OSF Ethical Committee.

## Results

As summarized in Table 1, the five ethnical groups showed significant differences in gender and age distribution.

**Table 1 – Age and gender data of the population.**

Geographical origin	N.	Males	Females	Age (years)	
				Mean	SD
East Europe	1730	679	1051	42.9	13.4
North Africa	2470	1806	664	38.2	10.9
Sub-Saharan Africa	976	706	270	37.1	11.9
Asia	1104	838	266	37.8	12.3
Latin America	2158	811	1347	40.2	13.0
Total	8438	4902	3536	39.5	12.4

SD, standard deviation.

However, neither of them could be considered an independent confounding factor.

All the medicines used by the population of the study could be divided into 56 ATC groups.

In the whole population, drugs for chronic conditions were used significantly more than those for acute diseases ( $154.2 \pm 45.9$  vs  $51.3 \pm 18.4$  DDD/1000 patients/day,  $P < 0.02$ ) and those for both acute and chronic conditions ( $57.9 \pm 12.8$  DDD/1000 patients/day,  $P < 0.02$ ); this difference remained significant after correction for age and gender and was present in all the five ethnical groups (Table 2). Table 2 also shows that significant differences among the different groups were observed, with East Europeans and Asians requiring more chronic medications than South Americans, Sub-Saharans and North Africans ( $P < 0.05$ ). On the contrary, no difference was seen among groups in the use of medicines for acute diseases and for both acute and chronic diseases.

The five most dispensed ATC groups of drugs are listed in Table 3. All of them are used in chronic conditions, and each one gave a comparable contribution to the high prevalence of chronic prescriptions; together, they accounted for 60% of chronic medications. Moreover, significant differences were detected among the different subgroups: Asians and East Europeans showed the greatest need for antihypertensive drugs (ATC groups C08 and C09); antidiabetic drugs (ATC group A10) were more often distributed to Asians, while lipid modifying drugs (ATC group C10) and antithrombotic drugs (ATC group B01) were mainly prescribed to East Europeans. The analysis of the combined use of the first five ATC drug classes in the different ethnic groups gave different patterns on a radar plot (Fig. 1).

A drug used both in acute and chronic conditions was found only in the sixth position. This is the ATC group C03 (diuretics), and again, an important difference among ethnical groups was observed (East Europeans  $13.6 \pm 5.4$ , North Africans  $11.1 \pm 4.5$ , Asians  $2.1 \pm 1.0$ , Sub-Saharans  $1.9 \pm 1.3$ , South Americans  $1.7 \pm 0.9$  DDD/1000 patients/day;  $P < 0.001$ ).

Vitamins (ATC group A11) were seventh in the ranking, with a peak consumption by Latin Americans ( $12.0 \pm 5.9$  DDD/1000 patients/day;  $P < 0.02$ ).

The remaining ATC groups were too small for a reliable statistical analysis.

## Discussion

Migration to the EU especially from countries with a high migratory pressure is continuously growing.<sup>4</sup> Only a

**Table 2 – Medicines used in the different ethnic groups on the basis of their indication for acute diseases (class A), for chronic diseases (group C), and for both (group B).**

Class of drug	East Europe	Latin America	Sub-Sahara	North Africa	Asia	Total	Mean ± SD	P-value (class C vs A and B)
A (for acute diseases)	43.7 ± 3.2	46.1 ± 7.5	51.2 ± 8.4	53.5 ± 9.4	61.8 ± 10.8	256.4	51.3 ± 18.4	<0.02
B (for acute and chronic diseases)	66.0 ± 8.2	56.5 ± 8.7	49.7 ± 7.3	63.4 ± 10.5	53.93 ± 9.4	289.5	57.9 ± 12.8	<0.02
C (for chronic diseases)	232.4 ± 38.6	140.3 ± 18.2	103.1 ± 17.9	102.4 ± 14.5	192.6 ± 29.4	770.8	154.2 ± 45.9	
P-value (East European vs other ethnic groups)		<0.05	<0.05	<0.05	N.S.			

NS, not significant; DDD, daily defined dose; SD, standard deviation; ANOVA, analysis of variance. Data expressed as DDD/1000 patients/day ± SD. P-values are for ANOVA testing.

**Table 3 – Distribution of the five more used (60% of total) ATC classes of medicines in the different ethnic groups.**

ATC class	East Europe	Latin America	Sub-Sahara	North Africa	Asia
C09: substances acting on the renin-angiotensin system	67.3 ± 18.2	39.4 ± 8.4	36.7 ± 12.5	13.1 ± 7.9	52.8 ± 15.8
A10: antidiabetics	24.5 ± 10.1	29.1 ± 11.3	13.3 ± 6.3	29.1 ± 9.7	43.2 ± 18.4
C08: calcium channel blockers	21.9 ± 8.8	14.9 ± 9.7	11.2 ± 4.6	7.5 ± 3.4	22.8 ± 10.2
C10: lipid modifiers	22.6 ± 9.4	9.6 ± 5.2	2.8 ± 1.1	6.5 ± 2.2	14.1 ± 8.3
B01: antithrombotics	20.5 ± 9.9	5.9 ± 6.1	4.7 ± 1.4	5.7 ± 1.8	9.3 ± 4.1

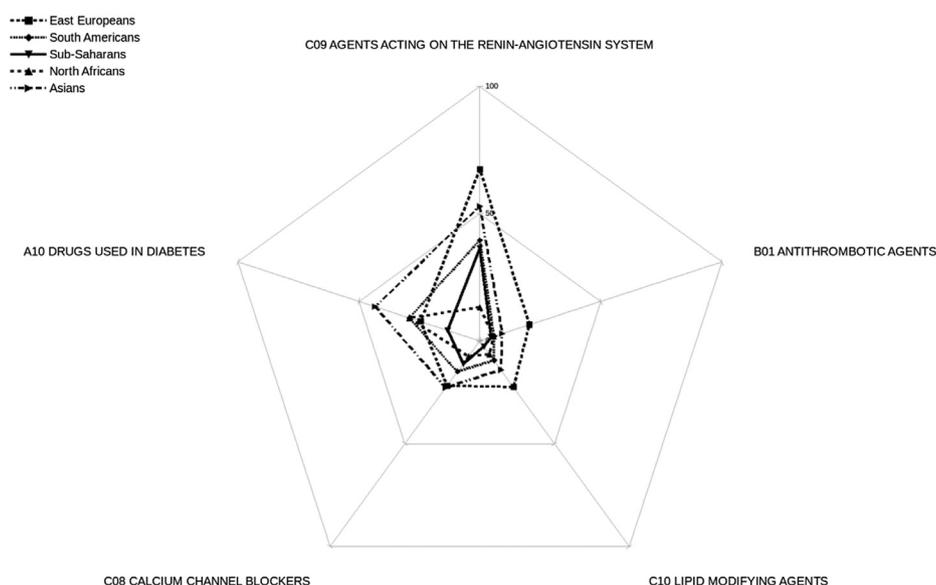
ATC, anatomical therapeutic chemical; DDD, daily defined dose; SD, standard deviation. Data expressed as DDD/1000 patients/day ± SD.

proportion of these people are regular migrants or become documented residents some time after their arrival in the host country. Health data for these regular subjects are usually available through public databases, and our country is no exception.<sup>15,16</sup>

In other words, when people, either migrants or natives, are somehow registered, we can evaluate their needs, and

possibly help them, even in the worst social conditions.<sup>17</sup> On the contrary, lack of any form of registration makes undocumented people unreachable and impossible to study systematically.

The method used in the present study, based on standardized daily drug use, has been proposed by WHO<sup>13</sup> and drawn on by our group<sup>12</sup> and other researchers in this field.<sup>16</sup>



**Fig. 1 – DDD/1000 subjects/day are shown on the axes for each of the five more prescribed ATC classes. The lines link all the points of each ethnic group. The different shapes of the polygons suggest that the difference among the groups is not due to a single ATC category, but each ethnic group has a peculiar frequency distribution of ATC class use. ATC, anatomical therapeutic chemical; DDD, daily defined dose.**

In our opinion, it may represent a reasonable way to obtain an insight into the health situation and health needs of undocumented migrants, although two biases should be considered. First, the prevalence of diseases is inferred from the amount of disease-specific medicines that is dispensed. This gives a quantitative idea, but does not tell us exactly how many individuals are affected, since the DDD method measures the quantity of medicines and not the number of patients.

Second, our population is a selected population of undocumented migrants, since it is made of undocumented migrants searching the assistance of an NGO, and we do not know what percentage of comparable subjects do not seek assistance. This is a common (almost unavoidable) problem with this type of research,<sup>11,18</sup> though also other methods of investigation (e.g., analysis of data from available registers) can miss important confounding factors as neighbourhood ethnic density,<sup>19</sup> the reason for migration<sup>9</sup> or insurance coverage.<sup>20</sup>

Keeping these observations in mind, chronic non-communicable diseases appear to be a serious problem in our population of undocumented migrants. This is in contrast with the 'healthy migrant effect' observed in the past in many countries,<sup>6,7</sup> but in line with more recent observations showing that, at least for regular migrants, health conditions tend, over the years, to overlap with those of the native population.<sup>8,21</sup> In our country, regular migrants show a pattern of chronicity which is only partially shared with natives: for both, the burden of chronic diseases increases with age, but documented migrants tend to report less chronic illnesses, which in turn affects younger subjects.<sup>16</sup>

It is more difficult to draw conclusions on specific diseases. Certainly, hypertension has a major role in the burden of chronic noncommunicable illnesses of our population, as can be argued from the high demand for drugs belonging to the ATC groups C08, C09 and C03, all used to treat hypertension.<sup>10</sup> This is especially true for subjects coming from Asia and Eastern Europe, while it is less clear for Africans, which, however, show a high use of ATC C03 group drugs (diuretics). For Africans, however, significant differences by country of origin in the prevalence of cardiovascular risk factors are known to exist,<sup>22</sup> a phenomenon encountered also among other ethnic groups.<sup>18</sup>

Also, diabetes is a well-known risk factor for cardiovascular diseases, and the use of antidiabetics is high in our population. Though this is more widespread, a peak is evident to occur for immigrants from Asia. Our results are in keeping with the observation that a higher incidence of diabetes, its complications and mortality from diabetes are present in ethnic minorities, as well as in females and in low socio-economical classes.<sup>23</sup>

Taken together, our data suggest that chronic cardiovascular diseases are an important part of the health problems of our population of undocumented migrants. On the contrary, for the above considerations on the method we used, we cannot draw definitive conclusions on the possible concomitance of more diseases in certain subjects or groups of subjects, a topic recently addressed in regular migrants.<sup>24</sup>

The problem of chronic diseases in undocumented migrants needs to receive due attention for its proper management in such a frail population which on one hand risks to

share the same difficulties of the native socially disadvantaged population in dealing with it,<sup>17,25</sup> while on the other, it is likely to receive less aggressive treatment for chronic diseases.<sup>26</sup> Moreover, unhealthy behaviours that are known to be so difficult to change in the native population<sup>27</sup> can be even harder to target and to modify in these subjects. Thus, with passing time, undocumented migrants could contribute to increase the burden of chronic noncommunicable diseases in EU countries.

We need to deal with this problem urgently and effectively, with the conscience that, sooner or later, it will exert a significant impact on EU National Health Services (NHS), in a period in which all of them are confronted with many challenges.<sup>28</sup> Some EU countries (including Italy) already provide a limited form of assistance to undocumented migrants, usually comprising emergency treatments and pregnancy care. This is deemed insufficient by some authors, but it should be considered that governments would like to make their countries less appealing to undocumented migrants in an attempt to save taxpayers' money.<sup>29</sup> On the other hand, an unrestricted access to the NHS for undocumented migrants is a policy which encounters the favour of only a part of a country's population.<sup>30</sup> Perhaps, educational interventions could be a first step in the management of this problem, but data on their usefulness and cost-effectiveness in these patients are completely lacking.

On the basis of our observations, we suspect that a significant amount of work must be done in a very short time; therefore, every additional bit of information in this area will be very useful.

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## Author statements

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### Ethical approval

This study was approved by a local Ethics Committee. The design of the study is an observational analysis of drugs dispensation, and therefore, the Ethics Committee did not require individual informed consent. No identifying information about participants is available in the article.

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### Competing interests

The authors declare that they have no competing interests.

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