

Drugs Delivery by Charities: A Possible Epidemiologic Indicator in Children of Undocumented Migrants

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Abstract Describing the health status of a population is difficult, especially in the case of irregular migrants who are now a growing population in western Countries. Data for children of these families are almost inexistent. In the absence of databases on this peculiar pediatric population, we analyzed drugs dispensation by a major Charity to have an insight into their health needs. This observational retrospective study was carried out during the entire 2015 and enrolled 628 undocumented children. A cohort of 8438 adult patients belonging to the same ethnic groups was used for comparison. Respiratory drugs were those most commonly prescribed, followed by those for skin and ocular diseases and by those for gastrointestinal disorders. Also in adults respiratory medications were the most dispensed, but almost in equal measure than cardiovascular drugs. To our knowledge this is the first study on the health needs of undocumented children residing in a western Country. The method we used seems to be a useful method for epidemiological analysis. As could be expected, respiratory and skin diseases ranked first, possibly owing to environmental factors.

Keywords Undocumented migrants · Children · Drugs prescription · Charity

Introduction

Describing the health status of a population is always difficult since it depends on many variables, including genetic, environmental and socio-economic determinants. Moreover, in Italy as in other Western Countries, the composition of the population is rapidly changing as a consequence of the massive phenomenon of migration; thus, beside the above mentioned factors, ethnic and cultural diversities have also to be considered. Many undocumented migrants escape from wars, persecutions, extreme poverty or other dangers. These, unlike the regular “economic migrants”, most of which are young adults in good health [1], frequently consist of entire families that move along with their children. Children are the most frail component of this *per se* frail population [2, 3], being more exposed to disease determinants than adults, especially in precarious life conditions as those encountered in the new Country [4]. Knowing their health needs is crucial to undertake preventive actions, since it has been shown that poverty and illness in childhood predispose to chronic diseases in adulthood [5, 6]. Nevertheless these studies are actually difficult, since the undocumented migrants, due to the fear to be identified or other factors, often do not seek help unless in emergencies, so that their children become virtually “invisible” to the common methods of epidemiological investigation. To deal with this situation, several centers were created in Italy to provide volunteer-based healthcare assistance for irregular migrants. Currently, only these charitable organizations possess reliable information concerning the health status of these foreigners not assisted

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by our National Health System (NHS). For these reasons we setup a scientific collaboration with one of these centers that each year assists several thousands of undocumented migrants. By using the data provided by their pharmacy we have measured the amount and type of drugs delivered to a large group of children during the entire 2015, considering it as a proxy of their health status. As already reported [7] this method, also endorsed by the WHO [8], can be the only way to get an insight into the health needs of a population when other methods are not available. It is particularly useful when a clear-cut correlation exists between a given drug (or a group of drugs) and a specific disease, although it provides only an overall picture that cannot be splitted down to individual patients. To ascertain if there were age-related differences in the observed epidemiological signals, we have also compared the data obtained in children with those acquired in a large group of undocumented adults during the same time period.

We believe that this study, despite its limitations, may be a useful contribution because, to our knowledge and at least in Italy, it represents the first attempt to investigate the health status of children whose parents are not complying with the registration requirements of the host Country. Our results, if confirmed by larger studies, could be the basis for implementing appropriate and patient-oriented public health policies.

Patients and Methods

Children and the Italian NHS: A Synthetic Overview

At birth all the Italian children are assigned to a family pediatrician until they are 6 years old and, afterwards, parents can choose to continue with the family pediatrician up to the age of 14 or register the child with a general practitioner. Prescription drugs are categorized into two classes: Class A includes essential medicines provided free of charge (although, depending on the Regional regulations, a co-payment may be request to the citizen) and Class C contains drugs not covered by the NHS, used to treat minor pathologies or otherwise not considered essential or life-saving. Self-medication products must be entirely paid by the patients and include the over-the-counter drugs (OTC), as well as other preparations (e.g. dietary products, food supplements, tonics, etc.). Class A drugs are reimbursable by the NHS only when prescribed by the family pediatrician (or the general practitioner) using a dedicated form. A specialist does not necessarily use the NHS form when prescribing a class A drug. In this case, after the visit, parents go to their family pediatrician who fills out the form for the medicine, so the prescription

becomes reimbursable. To date, children of undocumented migrants cannot be registered with a family pediatrician or a general practitioner. Like the Italian children, however, they are entitled to have all medical care (visits, immunizations, tests for the tuberculosis and other infectious diseases, etc.) and can seek treatment at all public health facilities. Nevertheless, a poor knowledge of the procedures, linguistic and cultural barriers and especially the fear to be registered, often prevents their parents to seeking help when necessary.

Data Source

We performed a retrospective observational study, approved by a local Ethic Committee, using the data obtained by the pharmacy of the Opera San Francesco (OSF), a major NGO located in Milan, that provides free health assistance to the undocumented migrants. In 2015, 9066 undocumented migrants received at least one drug following one or more medical examinations and among them 628 (about 7 %) were children. We stratified children according to sex, region of birth (Northern Africa, Sub-Saharan Africa, Central and Southern America, Eastern Europe and Asia) and age range (0–5, 6–11 and 12–14 years). A group of 8438 undocumented adults was used for comparison. They belonged to the same ethnic groups of the children, but were considered as a whole and not stratified by age, sex or geographical origin.

Outcome Measures

Prescription drugs and OTC compounds were classified according to the Anatomical Therapeutic Chemical (ATC) system, a taxonomic method based on the classification of drugs, depending on the organs or systems on which they act and their chemical, pharmacological and therapeutic properties [8]. The other products dispensed by the pharmacy were considered as a whole and not categorized. The outcome measures were the number and percentage of cartons supplied.

Results

628 children of undocumented migrants received at least one prescription from OSF in 2015 (Tab. 1). Among them, the North Africans were the majority (48.4 %), followed by the Latin Americans (24.5 %) and the East Europeans (19.0 %). Asians and Sub-Saharan Africans were scarcely represented (respectively 5.1 and 3 %). No significant gender differences were noticed within the various groups, and gender has not been considered an independent variable since we found no correlation between it and the

Table 1 Demographic characteristics of the study population: numerosity of each ethnic group and of each age range

Region of birth	Age (years)			Total
	0–5	6–11	12–14	
Northern Africa	128	119	75	322
Central and Southern America	41	60	62	163
Eastern Europe	19	38	35	92
Asia	11	8	13	32
Sub-Saharan Africa	6	5	8	19
Total	205	230	193	628

outcomes of our study (data not shown). Children were equally distributed among the three age ranges, though minor ethnical differences existed: more children less than 6 years were present in the Northern African group, while the 6–11 years group was more represented among East Europeans and the 12–14 years group among Sub-Saharan Africans (Tab. 1).

The 15 most dispensed therapeutic subgroups represented more than 80 % of the 1220 prescriptions recorded during the study period. Therapeutic subgroups below the 15th position were only seldom prescribed and therefore not considered. Drugs commonly used for respiratory tract infections and inflammatory diseases (analgesics, antipyretics, NSAIDS, cough preparations, anti-asthmatics, antihistamines, and nasal preparations) were the most dispensed (60.3 % of all prescriptions), followed by topical ophthalmic and dermatologic products (steroids, antibiotics, antimicrotics, eyedrops: 11.7 %) and gastro-intestinal drugs (anti-acids, stomatologic preparations, drugs for various gastro-intestinal diseases, vitamins: 7.7 %) (Tab. 2).

The highest prevalence of prescription was observed in first infancy (0–5 years: 50.2 %) and then declined in children aged 6–11 (31.6 %) and 12–14 years (18.2 %). However, when only drugs were considered, no significant age-related differences emerged (37.7, 35.5, and 26.8 %, respectively) (data not shown).

Respiratory drugs were most commonly prescribed in the 0–5 and 5–11 years age groups; those for gastro-intestinal diseases in the 12–14 years group. No age-related differences were seen for dermatologic and ophthalmologic preparations (Tab. 3).

The majority of drugs prescriptions occurred among North Africans (69.8 %), who constituted the largest group (data not shown).

Respiratory medicines were prescribed in comparable amounts in all the ethnic groups. Dermatologic products were mainly prescribed among East Europeans and those for the intestinal tract among Latin Americans and Sub-

Saharan Africans (Tab. 4). Table 5 shows the most dispensed molecules within the 15 therapeutic subgroups.

During the entire 2015 in the undocumented adults, an amount of drugs sufficient to cover 126,907 days of therapy was provided and each patient received an average of 15.04 days of therapy. The most dispensed drugs were those for the upper respiratory tract infections (29.61 %), more or less on par with the anti-hypertensive compounds (27.94 %) and followed by drugs for the treatment of peptic disease (21.11 %), antibiotics for systemic use (6.79 %) and NSAIDS (5.09 %) (data not shown).

Discussion

Our study population was mainly composed of sons of undocumented migrants coming from Northern Africa, Latin America and Eastern Europe, whereas other ethnic groups were only scarcely represented. This is not surprising, because the refugees from the Middle East generally do not remain in Italy, being directed to the Northern European Countries; those from Sub-Saharan Africa are often singles with no children and most of the Asians are now regular residents, well integrated and assisted by our NHS.

The pattern of drugs dispensation shows that respiratory infections, dermatitis, eye diseases and gastrointestinal disturbances are the most treated pathologies in our study population. It is well known that poverty itself is a risk factor for respiratory diseases, though it is unclear whether this derives from exposure to indoor pollutants, residential overcrowding, alimentary deficiencies, infections or other factors [9]. Many studies have demonstrated a link between an unsatisfactory social and residential situation and incidence, morbidity and mortality for respiratory diseases [10–12]. Malnutrition and the unhealthy life styles of lower social classes are known to have an important role [13, 14] and this is especially true for children [15]. It has also been observed that low socio-economic conditions early in life increase the risk of chronic respiratory diseases in adulthood [6]. Our data show a high demand for anti-inflammatory drugs and systemic antibiotics, but also for mouthwashes, nasal decongestants and antipyretics, reflecting the difficulty to pay for this auto medication products by these families. Concerning the great request of anti-asthmatic medicines, it should be considered that Italian pediatricians often prescribe them also for wheezing of viral etiology, although in this case evidence for their efficacy is lacking [16, 17]. No differences were noticed in the pattern of dispensation of respiratory drugs among the various ethnic groups, so confirming the pivotal role played by environmental factors in respiratory diseases.

Table 2 ATC therapeutic subgroups most frequently delivered

Therapeutic subgroups	Prescriptions	
	n	%
Drugs for respiratory diseases		
N02-Analgesics and antipyretics	265	21.7
J01-Antibacterials for systemic use	143	11.7
M01-Anti-inflammatory and antirheumatic products	123	10.1
R05-Cough and cold preparations	80	6.6
R03-Drugs for obstructive airway diseases	73	6.0
R06-Antihistamines for systemic use	47	3.9
R01-Nasal preparations	36	3.0
Total	767	63.0
Drugs for skin and ocular diseases		
D07-Corticosteroids, dermatological preparations	40	3.3
D06-Antibiotics and chemotherapeutics for dermatological use	34	2.8
D01-Antifungals for dermatological use	25	2.0
S01-Ophthalmologicals	44	3.6
Total	143	11.7
Drugs for digestive tract diseases		
A02-Drugs for acid related disorders	25	2.0
A03-Drugs for functional gastrointestinal disorders	17	1.4
A01-Stomatological preparations	16	1.3
A11-Vitamins	36	3.0
Total	94	7.7

Table 3 ATC Therapeutic Subgroup most frequently delivered by age, expressed as percentage of all drugs delivered to each age group

Therapeutic subgroups	0–5 years	6–11 years	12–14 years
N02-Analgesics anti-pyretics	30.0	20.1	11.9
J01-Antibacterials for systemic use	9.1	12.7	14.1
M01-Anti-inflammatory and antirheumatic products	9.3	9.0	12.5
R05-Cough and cold preparations	6.5	8.8	3.7
R03-Drugs for obstructive airway diseases	7.8	7.4	1.5
R06-Antihistamines for systemic use	3.0	5.1	3.4
R01-Nasal preparations	2.4	3.7	2.8
D07-Dermatological corticosteroids	2.4	3.2	4.6
D06-Dermatological antibiotics and chemotherapeutics	1.7	1.8	5.5
D01-Antifungals for dermatological use	2.2	2.5	1.2
S01-Ophthalmologicals	3.0	4.6	3.1
A02-Drugs for acid related disorders	0.0	0.5	7.0
A03-Drugs for functional gastrointestinal disorders	2.0	0.0	2.4
A01-Stomatological preparations	1.1	0.9	2.1
A11-Vitamins	4.3	1.4	3.1
Total	82.4	81.7	78.9

The fact that dispensation of medications for skin and eyes rank second in our population is in line with the observation that dermatologic diseases are very common, especially in children and in groups at risk, independently from age and ethnic origin [18, 19]. In Sub-Saharan Africa and tropical regions, skin infections account for a large percentage of all

diseases [20–23]. Though poverty and environmental conditions can be risk factors for these diseases, it must be underlined that dermatological medicines are frequently prescribed also to Italian children without socio-economic problems [24].

Our study shows a heavy dispensation of medicines for peptic ulcer and gastro-esophageal reflux, which is in

Table 4 ATC Therapeutic Subgroups most frequently delivered by ethnicity (data are expressed as percentage of all drugs delivered to each ethnic group)*

Therapeutic subgroups	Northern Africa	Central and Southern America	Eastern Europe
N02-Analgesics anti-pyretics	29.3	15.2	9.6
J01-Antibacterials for systemic use	11.4	12.2	17.4
M01-Anti-inflammatory and antirheumatics	13.4	4.6	7.8
R05-Cough and cold preparations	8.2	4.2	5.4
R03-Drugs for obstructive airway diseases	7.6	6.8	1.8
R06-Antihistamines for systemic use	3.9	6.8	1.8
R01-Nasal preparations	3.3	4.6	0.6
D07-Dermatological corticosteroids	2.3	4.2	6.6
D06-Dermatological antibiotics and chemotherapeutics	2.2	4.6	3.0
D01-Antifungals for dermatological use	1.9	1.3	4.8
S01-Ophthalmologicals	3.9	3.4	4.8
A02-Drugs for acid related disorders	1.5	5.5	1.2
A03-Drugs for functional GI disorders	1.3	2.1	0.6
A01-Stomatological preparations	1.2	1.7	1.2
A11-Vitamins	2.6	3.8	4.8
Total	94.0	81.0	71.4

* Data concerning subjects from Asia and Sub Saharan Africa are not reported here due to the low number of children

Table 5 List of active substances most frequently delivered for each ATC Therapeutic Subgroups

ATC therapeutic subgroups	Active substances
N02-Analgesics anti-pyretics	Paracetamol; Acetylsalicylic acid; Oxolamine+Propyphenazone
J01-Antibacterials for systemic use	Amoxicillin clavulanate; Amoxicillin; Cefpodoxime
M01-Anti-inflammatory and antirheumatic products	Ibuprofen; Ketoprofen; Nimesulide
R05-Cough and cold preparations	Ambroxol; Carbocysteine; Levodropropizine; Acetylcysteine; Cloperastine
R03-Drugs for obstructive airway diseases	Beclomethasone; Albuterol; Budesonide
R06-Antihistamines for systemic use	Cetirizine; Oxatomide; Levocetirizine
S01-Ophthalmologicals	Tobramycin; Levocabastine; Tobramycin+Dexamethasone
D07-Dermatological corticosteroids	Gentamicin+Betamethasone; Hydrocortisone; Fluprednidene+Miconazole
A11-Vitamins	Complex vitamins+Minerals
R01-Nasal preparations	Silver proteinate; Budesonide; Acetylcysteine+Tuaminoheptane
D06-Dermatological antibiotics and chemotherapeutics	Gentamicin; Neomycin+Bacitracin; Acyclovir
A02-Drugs for acid related disorders	Pantoprazole; Omeprazole; Lansoprazole; Rabeprazole
D01-Antifungals for dermatological use	Clotrimazole; Bifonazole; Miconazole; Ketoconazole
A03-Drugs for functional gastrointestinal disorders	Dimethicone; Domperidone; Metoclopramide
A01-Stomatological preparations	Flurbiprofen; Hexetidine; Miconazole

agreement with observations made by others in socially and economically fragile populations; it has also been reported that their use is higher in immigrants than in Italians [25]. A possible explanation is that *helicobacter pylori* infection is inversely related to the socio-economic level and this appears to be the case especially for children [26]. However our data do not allow us to understand if

gastro-protectants were used to treat specific conditions or to prevent gastric damage by other therapies.

Finally we must underline the high request of non-pharmaceutical products, especially during the first infancy. This reflects the economic problems of the families which should be considered when dealing with the health needs of this population.

The data obtained in adult patients seem to indicate that undocumented children suffer from diseases that seem at least partially different from those of their parents. The observation that even among adults, nose and throat decongestants, antibiotics and antipyretics were largely dispensed would indicate that infections of the upper airways are likely due to environmental factors that they share with their children. Instead, it seems obvious to note that prescription of anti-hypertensive drugs is typical of the adult population, since the incidence of cardiovascular diseases is very low among children. Finally, regarding the high dispensation of drugs for peptic ulcer and gastro-esophageal reflux, it must be emphasized that even in adults they are often prescribed to prevent a possible gastric damage caused by other drugs and therefore it is difficult to estimate the true prevalence of these diseases.

Overall, the main limitation of our analysis is that we considered only one of the various charities operating in Italy. Different epidemiological signals could emerge by expanding the study. However it should be pointed out that OSF is one of the biggest Italian charities, serving several thousands of patients that can be considered representative of the whole migrant population in Italy.

Our work is the first attempt to evaluate the health needs of children belonging to families of undocumented migrants, a population difficult to study since it escapes all standard epidemiological surveys. Moreover, unlike other pediatric pharmaco-epidemiologic studies, that considered only the prescription drugs [24, 27], we have analyzed also OTC medicines. This approach gives a more complete picture of the health needs of this population. Finally, our study supports the fact that data on drug utilization can be an important tool for epidemiological analysis and public health interventions.

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Compliance with Ethical Standards

Conflict of interest The authors declare they have no conflict of interest.

Research Involving Human Participants and/or Animals This article does not contain any studies with animals performed by any of the authors.

Informed Consent This study was approved by a local Ethics Committee. The design of the study is a retrospective 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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