

Brief Report

Pharmacoepidemiological data from drug dispensing charities as a measure of health patterns in a population not assisted by the Italian National Health Service

Silvia Bini,¹ Cesare Cerri,² Antonello E. Rigamonti,¹ Pietro A. Bertazzi,¹ Gianfrancesco Fiorini,¹ Silvano G. Cella¹

¹Department of Clinical Sciences and Community Health, University of Milano; ²Department of Surgery and Translational Medicine, University of Milano-Bicocca, Italy

Significance for public health

Our work may be important for public health mainly under two aspects: i) likely, the analysis of drugs dispensation by Charities is currently the only way to assess health patterns and needs of the low income population not assisted by the Italian National Health Service (NHS), that would otherwise be virtually invisible. Based on the present results, we plan to use this approach for increasing our knowledge on this rapidly growing component of all western societies by investigating ethnic and environmental influences, prescription appropriateness, therapeutic compliance, *etc.* ii) We have shown that this population, when compared to the NHS assisted one, has both some peculiar features (*e.g.* a greater use of respiratory drugs) and some comparable patterns (*e.g.* a growing prevalence of chronic diseases).

Abstract

We analysed drug dispensation by charitable organisations in a year time. Drugs were grouped according to the Anatomic Therapeutic Chemical classification and the amount dispensed was calculated with the system of the Daily Defined Dose (DDD) and expressed as DDD/1000 subjects/day. A number of 87,550 subjects were studied (13,308 Italians; 74,242 Immigrants). Though we noticed a great seasonal variability, the drugs most frequently dispensed were those for the respiratory, cardiovascular and gastrointestinal system and antibiotics, which is different from the rest of the Italian population and the immigrant population assisted by our National Health Service (NHS). We also found that chronic diseases are increasing in these subjects. We conclude that the subjects not receiving NHS assistance have, at least in part, different health patterns and requirements. This should be considered when planning tailored interventions.

Introduction

In Western societies two factors affecting population health patterns are nationality of birth¹ and immigration across national borders.² While comprehensive data are available for the first aspect,^{1,3} complete and reliable information for immigrants is available only for those complying with the registration requirements of the host

Country.⁴ The same is true for natives who, for different reasons, do not benefit of the National Health Service (NHS). Measuring the amount and type of drugs distributed by charitable organisations to people not assisted by the NHS, can be the only way to obtain a proxy of their health pattern, as previously reported.⁵ This method is particularly useful when a definite correlation exists between a given drug (or a group of drugs) and a specific disease. Its main limitation is yielding an overview picture that cannot be splitted down to individual patients. However, this appears to be the only available tool to get an insight into the health status of such peculiar population, a point that appears to have a growing importance in order to implement appropriate, patient oriented and effective public health policies. In the present study on 87,550 subjects of this type, we present the complete data of one year, in conjunction with preliminary demographic data. Moreover we make some preliminary observations on potential seasonal variations in drug dispensation, an issue that could deserve further investigation, in the perspective of suitable preventive interventions.

Design and methods

The data in this retrospective study, collected in the period January-December 2014, were obtained from the *Banco Farmaceutico* (BF), an Italian Non Governative Organisation which supplies medicines to over 1500 centres distributed throughout the entire national territory and curing people not assisted by our NHS. The study population, representative of the entire population cared for by the BF, is described according to gender, macro-region of birth, age distribution (three groups: ≤ 17 , 18-64, and ≥ 65 years) and duration of the presenting illness (acute *vs* chronic). As we have already done in a previous study⁵ the dispensed drugs were grouped according to the anatomical therapeutic chemical (ATC) classification and their quantities calculated using their daily defined dose (DDD), both methods widely established at the international level to measure drug utilisation. The ATC classification is a taxonomic method based on the classification of drugs according to the organs or systems on which they act and their chemical, pharmacological and therapeutic properties. The DDD is a technical unit of measure representing the daily maintenance dose in adults, relatively to the main therapeutic indication of the drug. It is therefore a standard unit and not the recommended dose for the individual patient, which may vary according to many other factors, such as age, genetic determinants, presence of co-morbidity, multiple drug treatments, *etc.* For each ATC category, the quantity of drug dispensed was

expressed as DDD/1000 patients/day, thus obtaining a synthetic overview of the therapeutic needs of the entire population. Statistical analysis was performed using either parametric or non parametric tests as appropriate.

Results

In Table 1 it is shown that drugs for the respiratory tract are globally the more dispensed. They are followed by those for the cardiovascular system and those for the gastrointestinal tract and antibiotics. We found also significant seasonal variations in the dispensation of medicines (data not shown). We analysed this phenomenon for the most commonly dispensed drugs (*i.e.* those for the respiratory system) and we found a statistically significant difference ($P < 0.001$) for the seasonal distribution, with a peak in the coldest months and a minimum in the summer. A seasonal difference existed also for cardiovascular and gastrointestinal drugs, with a dispensation peak in autumn (data not shown).

The characteristics of the population are shown in Table 2. The majority is constituted by immigrants, though Italians account for approximately one fifth. Adult males are the more represented. Patients usually seek the help of charitable drug dispensing centres for acute problems, but a significant percentage of subjects with chronic diseases is also present.

Discussion and Conclusions

In countries having a NHS or other forms of widespread health insurance, population health patterns are well known and constantly updated. This is the case also in our Country.^{1,3} The same is true as well for immigrants who comply with national regulations, becoming therefore beneficiaries of NHS services. Complete data on their health patterns and requirements are made available by local and national sanitary institutions.⁴ Unfortunately there is a part of the population that escapes this kind of assessment. This is constituted of a majority of migrants from other European (EU) and non EU countries in conjunction with a minority of natives who are either drop-outs or too poor to afford participation in NHS or health insurance expense participation.⁶

For this population few data are available in literature, in spite of the growth of information for legal immigrants in recent years. This information seems to point to significant health pattern differences for immigrants according to their countries of origin,⁷ though other factors play an important role too.⁸

A first attempt to investigate the health patterns and requirements of the population usually escaping official health surveys could be through the pharmacoepidemiological data of the drug dispensing charities. This method, endorsed by the World Health Organisation, yields information on daily DDDs every 1000 subjects and appears to be suitable for this type of studies, as already demonstrated in a preliminary report.⁵ Despite the limitation of this method, some conclusions can be drawn from our data. First, it is clear that some ATC classes are sharply more represented: these are, in the order, respiratory, cardiovascular and gastro-intestinal drugs. This is only in part concordant with the distribution seen in the Italian native population, in which cardiovascular diseases rank first and the specific medicines are the more prescribed,³ while legal immigrants consume more medicines for the gastrointestinal tract, followed by non steroidal antiinflammatory drugs.⁴ Other studies have found different distributions of disease patterns in immigrant population, but the data are sometimes divergent. For example some authors have found a significant prevalence of cardiovascular diseases, especially hypertension,⁹ while others have even observed a decreased risk of cardiovascular events.¹⁰ The latter data are more in agreement with our observations, though they do not mention the impact of respiratory diseases. These, in our population seem to represent an important problem, especially in the coldest months of the year, while the dispensation of other medicines, *e.g.* those for the cardiovascular system, seem to follow a different pattern. At the moment we have no explanation for this and we are trying to obtain more detailed information. Finally, as reported by others⁴ we have found that that chronicity is a growing problem among immigrants, and it increases with increasing age.

In conclusion, the data of this preliminary study indicate that this particular population, so difficult to analyse because of its peculiarities that make it virtually *invisible* to the common methods of investigation, shows significant differences as compared to Italian citizens and foreign residents. This, on one hand, indicates that it is necessary to plan *ad hoc* interventions to take charge of their health needs, on the other hand it underlines the necessity of further studies on single drug-disease associations.

Table 1. Principal anatomical therapeutic chemical (ATC) categories of pharmaceutical products prescribed by the centers from January to December 2014. ATC classes that were rarely or never prescribed are not shown.

ATC category	DDD/1000 patients/day	Therapeutical groups most commonly prescribed
A) Alimentary tract and metabolism	8.7	Antiulcer (peptic) and GORD; stomatological preparations; hypoglycaemic agents
B) Blood and blood forming organs	1.0	Antithrombotic agents; Iron Preparations; vitamin B12 and folic aAcid
C) Cardiovascular system	11.1	Cholesterol-lowering; ACE inhibitors; beta blocking agents
D) Dermatologicals	0.2	Antiseptics and disinfectants; emollients and protective; antifungals for topical use
G) Genitourinary system and sex hormones	0.7	Drugs for benign prostatic hypertrophy; progestogens; Eestrogens
H) Systemic hormones (excl. sex hormones)	0.7	Corticosteroids for systemic use; thyroid preparations; antithyroid preparations
J) Anti-infectives for systemic use	2.8	Beta-lactam; penicilins; quinolones; macrolids; lincosamides and streptogramins
L) Antineoplastic and immunomodulators	0.2	Immunosuppressants; hormone antagonists and related agents; hormones and related agents
M) Musculo-skeletal system	2.1	NSAIDs; antiout preparations; drugs affecting bone structure and mineralization
N) Central nervous system	1.2	Antidepressants; antiepileptics; dopaminergic agents
R) Respiratory system	12.2	Decongestants and other nasal and throat preparations for topical use; expectorants
S) Sensory organs	0.3	Antiglaucoma and miotics

Table 2. Characteristics of the population.

Characteristics	%
Gender	
Males	61.3
Females	38.7
Age distribution	
Minors (<17 years)	13.0
Adults (18-65 years)	75.3
Elderly (>65 years)	11.7
Geographical region of birth	
Italy	15.2
Maghreb	26.0
Eastern Europe	24.4
Sub-Saharan Africa	13.0
Latin America	7.8
Central and Eastern Asia	7.2
Middle East	2.7
Other origin	3.7
Disease duration	
Acute	54.4
Chronic	45.6

Correspondence: Silvano G. Cella, Department of Clinical Sciences and Community Health (Pharmacology), University of Milano, Via Vanvitelli 32, 20129 Milano, Italy.

Tel.: +39.02.503.17015.

E-mail: silvano.cella@unimi.it

Key words: Immigrants; Pharmacoepidemiology; Drug dispensation; Health needs.

Contributions: BS and RAE collected and analysed the data; CC helped with statistical analysis; BPA discussed the results; CSG and FG chaired the group and wrote the manuscript.

Conflict of interest: the authors declare no potential conflict of interest.

Received for publication: 8 September 2015.

Accepted for publication: 10 February 2016.

©Copyright S. Bini et al., 2016

Licensee PAGEPress, Italy

Journal of Public Health Research 2016;5:623

doi:10.4081/jphr.2016.623

This work is licensed under a Creative Commons Attribution NonCommercial 4.0 License (CC BY-NC 4.0).

References

- Hasselaar J, Engels Y, Menten J, et al. The burden of non-acute dying on society: dying of cancer and chronic disease in the European Union. *BMJ Support Palliat Care* 2012;2:334-8.
- Acevedo-Garcia D, Sanchez-Vaznaugh EV, Viruell-Fuentes EA, Almeida J. Integrating social epidemiology into immigrant health research: a cross-national framework. *Soc Sci Med* 2012;75:2060-8.
- The Medicines Utilization Monitoring Centre. National Report on Medicine use in Italy. January-September 2014. Rome: Italian Medicines Agency; 2015.
- Andretta M, Cinconze E, Costa E, et al. Farmaci e immigrati. Rapporto sulla prescrizione farmaceutica in un paese multietnico. Roma: Il Pensiero Scientifico Editore; 2013.
- Bini S, Rigamonti AE, Fiorini F, et al. Health needs assessment in patients assisted by a pharmaceutical NGO: a preliminary survey based on the analysis of drug dispensation within Italy's "Banco Farmaceutico". *It J Med* 2016;10:111-8.
- Kemp A, Roughead E, Preen D, et al. Determinants of self-reported medicine underuse due to cost: a comparison of seven countries. *J Health Serv Res Policy* 2010;15:106-14.
- Sewali B, Harcourt N, Everson-Rose SA, et al. Prevalence of cardiovascular risk factors across six African immigrant groups in Minnesota. *BMC Public Health* 2015;15:411-8.
- Arevalo SP, Tucker KL, Falcón LM. Beyond cultural factors to understand immigrant mental health: neighborhood ethnic density and the moderating role of pre-migration and post-migration factors. *Soc Sci Med* 2015;138:91-100.
- El Fakiri F, Bruijnzeels MA, Foets MME, Hoes AW. Different distribution of cardiovascular risk factors according to ethnicity: a study in a high risk population. *J Imm Min Health* 2008;10:559-65.
- Okrainek K, Bell CM, Holland S, Booth GL. Risk of cardiovascular events and mortality among a population-based cohort of immigrants and long-term residents with diabetes: are all immigrants healthier and if so, for how long? *Am Heart J* 2015;170:123-32.