Health Policy 116 (2014) 188–195

Contents lists available at ScienceDirect

Health Policy

journal homepage: www.elsevier.com/locate/healthpol

Predictability of pharmaceutical spending in primary health services using Clinical Risk Groups

David Vivas-Consuelo[a,*], Ruth Usó-Talamantes[b], José Luis Trillo-Mata[b], Maria Caballer-Tarazona[c], Isabel Barrachina-Martínez[a], Laia Buigues-Pastor[a]

[a] Research Centre for Health Economics and Management, Universitat Politècnica de València, Cno de Vera s/n, Valencia, Spain
[b] Valencian Community Government, Health Department (Conselleria de Sanitat), General Direction of Pharmacy and Pharmaceutical Products, PharmacoEconomics Office, Valencia, Spain
[c] Faculty of Economics, Universitat de València, Spain

ARTICLE INFO

Article history:
Received 9 May 2013
Received in revised form
18 December 2013
Accepted 14 January 2014

Keywords:
Risk adjustment
Pharmacy expenditure
Clinical Risk Groups
WHO-ATC-Code

ABSTRACT

Background: Risk adjustment instruments applied to existing electronic health records and administrative datasets may contribute to monitoring the correct prescribing of medicines.
Objective: We aim to test the suitability of the model based on the CRG system and obtain specific adjusted weights for determined health states through a predictive model of pharmaceutical expenditure in primary health care.
Methods: A database of 261,054 population in one health district of an Eastern region of Spain was used. The predictive power of two models was compared. The first model (ATC-model) used nine dummy variables: sex and 8 groups from 1 to 8 or more chronic conditions while in the second model (CRG-model) we include sex and 8 dummy variables for health core statuses 2–9.
Results: The two models achieved similar levels of explanation. However, the CRG system offers higher clinical significance and higher operational utility in a real context, as it offers richer and more updated information on patients.
Conclusions: The potential of the CRG model developed compared to ATC codes lies in its capacity to stratify the population according to specific chronic conditions of the patients, allowing us to know the degree of severity of a patient or group of patients, predict their pharmaceutical cost and establish specific programmes for their treatment.

1. Introduction

Pharmaceutical expenditure is nowadays one of the most important and increasing factors in financial terms in healthcare in European countries [1]. Therefore, explaining the variations of expenditure on medicines is of paramount value. Due to the fact that patient complexity is a major determinant of expenditure, methodologies aimed at allocating an average pharmaceutical expenditure by specific patient characteristics are of great use in monitoring the range of prescription of medicines and therefore pharmaceutical expenditure.

There are different grouping systems based on existing administrative and clinical data that can explain and predict pharmaceutical expenditure. Some of these are based on electronic prescription information, such as WHO-ATC and the Rx models [2–5]. Others are based on diagnoses: Clinical Risk groups (CRGs) [6,7], Adjusted Clinical Groups (ACGs) [8] and Diagnostic Cost Groups, (DCG). Finally there are the mixed models that combine both – Diagnostic Cost Groups, (DCG/Rx) [9] and Adjusted Clinical Groups (ACG/Rx) [10]. The usefulness of these models is especially

* Corresponding author. Tel.: +34 963877062; fax: +34 963877962.
E-mail address: dvivas@upv.es (D. Vivas-Consuelo).

0168-8510/$ – see front matter © 2014 Elsevier Ireland Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.healthpol.2014.01.012

relevant for integrated health systems such as National Health Systems.

These tools described above also allow stratification of the population according to morbidity, which permits patients with the greatest risk to benefit from case management programmes. This improves the quality of care and life, as this system allows individuating the specific state of health of the population and makes it possible for patients to be introduced into disease management programmes.

This paper focuses on testing the suitability of CRGs for predicting expenditure in pharmacy budget allocation in an Autonomous Community in Eastern Spain. We also show the importance of using local weighting as opposed to standard weighting [7].

2. The Valencian health system and pharmaceutical management

This study was carried out in the Valencia Community (VC) in Spain, where pharmaceutical management is decentralised, being divided into 24 health districts. Each health district receives an annual per capita amount to attend to its assigned population. The flow of incoming and outgoing patients to and from other health districts generates an inter-centre turnover to establish the corresponding economic compensation [11]. The allocated budgets include a specific section for pharmaceutical expenditure that, at present, is adjusted only by socio-demographic variables, such as age, sex and pharmaceutical co-payment. The adjustment was made using a Standardized Amount Indicator built with the above-mentioned variables that allocated a cost per equivalent patient standardized [12]. The predictive level of this model is lower than 15%. This low percentage is basically due to the non-inclusion of morbidity variables, which best serve to explain the behaviour of pharmaceutical expenditure, but nevertheless are not reflected in the current budget allocation for health departments.

Some research exists using different grouping systems for predicting or studying total health expenditures [3–6,13], but we lack research using these methods to focus specifically on pharmacy expenditure [14,15].

The adjustment by chronic conditions that CRG classification provides offers a great innovation for pharmaceutical management in allowing the rationalization of pharmaceutical expenditure. The VC has introduced tools over recent years that have the objective of establishing clinical criteria that improve efficiency in pharmaceutical prescription. Given that the clustering criteria of CRG classification is based on unhealthy and chronic conditions, this system provides the doctor with information about the severity of his patients and an adjusted pharmaceutical expenditure forecast. This is only possible with a reliable and comprehensive Electronic Health Record (EHR), where all clinical encounters and coded diagnostics of patients in the different health care system settings are registered [16].

Previously, when a reliable EHR was not available, prescription data and WHO-ATC codes were used to establish the risk adjustment system [17]. However, although this system achieves a high explicative power for pharmaceutical expenditure, it is difficult to operate and has poor clinical use, as it is not connected with the EHR and a regular cross section calculation of weights is necessary. In the VC, the CRG system is in a period of implementation and testing.

2.1. The Clinical Risk Groups

We have chosen Clinical Risk Groups (CRGs) as it is a system that classifies individuals into mutually exclusive categories with clinical significance [18]. Using enrolment data, claims or other encounter level data, this system assigns each person with a chronic health condition to a severity level. CRG classification of the individual is by medical care services used over an extended period of time.

All groups can be classified into 9 statuses from healthy individuals to individuals with catastrophic condition. CRGs (1079 groups) are consolidated into three tiers of aggregation referred to as Aggregated Clinical Risk Groups (ACRGs). The three successive tiers of aggregation are referred to as ACRG1 (416 groups), ACRG2 (151 groups) and ACRG3 (38 groups), with ACRG3 being the highest level of aggregation, consisting of severity adjusted statuses. Each successive tier maintains status and severity levels while reducing the number of groups. Although the aggregation of CRGs reduces clinical precision, it maintains clinical meaningfulness. The ACRGs take into consideration the future medical care needs and clinical similarity of the individuals assigned to them.

The CRG system can be used to understand patterns of health service use and consumption and to develop applications for risk and price adjusting [7], although their use in pharmaceutical expenditure adjustment has not been tested [15]. The main clinical and managerial characteristic is their ability to identify patterns of pharmaceutical consumption in relation to the chronic conditions of a determined patient. For example, should a group of patients with an excessive pharmaceutical cost be identified, it can determine if this is related to the chronic condition they have and help establish corrective measures.

The principal difficulty with the use of CRGs is the need for exhaustive and reliable information on diagnoses and use of health care services over a long period of time (minimum one year). Therefore, when this information is not available, the ATC model may be a suitable option.

To obtain the CRGs we used 3M^{TM} Clinical Risk Grouping Software v.1.4. CRGs capture the resource utilization of all inpatient and ambulatory encounters, identifying individuals with multiple chronic co-morbid conditions and explicitly specifying the severity of illness for each individual

The main aim of this paper is to test the suitability of the model based on the CRG system and obtain specific adjusted weights for determined health states through a predictive model of pharmaceutical expenditures in primary health care.

In this study, we developed a predictive model based on CRG grouping into 9 health states and the weights for each state were calculated using real data. We used an appropriate comparison system, described in a recent work [17], the ATC-model, a retrospective model that classifies patients according to the number of chronic conditions in 9 groups,