



ORIGINAL ARTICLE

Management by objectives and its impact on specialist prescription quality at discharge and in external consultations[☆]

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KEYWORDS

Quality management;
Quality indicator;
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Abstract

Objective: To verify that implementing a policy of management by objectives, based on collaboration between hospital pharmacy, primary care and specialised medical managers, improves prescription quality indicators in specialised care and reduces unwanted “induced” prescriptions (i.e. those issued by specialists, hospital doctors or the patients themselves) in primary care.

Method: A four year quasi-experimental controlled intervention study on prescription at discharge and in outpatient hospital consultations was conducted. In hospital A, a quality cycle was applied: assessment, identifying improvement opportunities, implementing corrective actions and re-assessment. However, it was not applied in control hospital B. The indicators chosen were the percentage of generic medicines prescribed, the percentage of prescriptions for new therapies with no added value and the percentage of prescriptions for ACE inhibitors recommended.

Results: In hospital A, an increase in indicators 1 and 3 has been observed, both being statistically significant, between the last year of intervention and the year previous to intervention. Hospital A managed to reduce indicator 2 to 4.5% while this indicator increased in hospital B to 8.8%. Furthermore, a statistically significant difference in indicators between the two hospitals has been registered.

Conclusion: Pay-for-Performance programs in prescription practices of hospital physicians are effective actions to improve quality indicators of medication use.

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PALABRAS CLAVE

Gestión de calidad;
Indicador de calidad;
Prescripción de
medicamentos;
Dirección por
objetivos

Dirección por objetivos y su impacto sobre la calidad de la prescripción de los especialistas al alta y en consultas externas

Resumen

Objetivo: Comprobar que la aplicación de una política de dirección por objetivos basada en la coordinación de Farmacia Hospitalaria, Atención Primaria y Dirección Médica, mejora los indicadores de calidad de la prescripción en el ámbito de la asistencia especializada y reduce la prescripción inducida no deseada en el ámbito de la asistencia primaria.

Metodología: Estudio de intervención cuasi-experimental controlado sobre la prescripción médica al alta y en las consultas externas de hospital durante 4 años. En el hospital A se aplicó el ciclo de calidad: evaluación, detección de oportunidades de mejora, puesta en marcha de medidas correctoras y reevaluación, y en el hospital B que se usó como control no se aplicó. Los indicadores escogidos fueron: %de prescripciones de especialidades genéricas, %de prescripciones de novedades terapéuticas sin valor añadido y %de prescripciones de IECA recomendados.

Resultados: En el hospital A, entre el último año de intervención y el año preintervención, se produjo un aumento en los indicadores 1 y 3 siendo estadísticamente significativo en ambos. En el hospital A se consiguió disminuir el indicador 2 hasta un 4,5% mientras que en B aumentó hasta 8,8%, siendo estadísticamente significativa la diferencia entre los dos hospitales.

Conclusión: La propuesta de objetivos de mejora de la prescripción ligados a estímulos de tipo económico es una acción efectiva para aumentar el valor de algunos indicadores de calidad de la prescripción.

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Introduction

Medication is one of the main therapeutic resources in the health care process as it is used in many preventative interventions, as well as in most curative interventions, as an intermediary mechanism to achieve a specific health target. Furthermore, medication is common to all the different health care levels and, therefore, cuts across all levels of the health care system. It is a fact that drug prescription in outpatient consultations and on discharge has an enormous effect on prescriptions by primary care (PC) doctors. This is because, except for the case when medication is dispensed in ambulatory care, most patients are subsequently followed up in PC, including the renewal of prescriptions issued in specialist care (SC). It is here that the Spanish concept of "induced" prescription (IP) appears (i.e. those issued by specialists, hospital doctors or the patients themselves). In this situation, the primary care doctors simply renews the treatment prescribed by a specialist without making any changes to it, even though they have the ability and are obliged to do so if they believe that it is not suitable.¹⁻⁴ The follow-up of outpatient prescriptions in specialised care (SC) highlights the fact that strategies need to be developed to improve this process.⁵ This is a field that the departments of hospital pharmacy should consider, given that it is in the health authorities' interest to control the spiralling health care costs.

Following the example of other fields,⁶ a regional pharmacy commission has been operating in our health care

region for a number of years with the aim of coordinating pharmaceutical actions between SC and PC. This commission has promoted the publication of the guidelines *Guía Farmacoterapéutica y de Intercambio terapéutico* (pharmacotherapeutic and therapeutic interchange guidelines)⁷ that will certainly help specialist and primary care doctors to unify prescription issuance criteria. Furthermore, one of the hospitals in the region has had the Management by Objectives (MBO) strategy in force since the beginning of 2002. This is a management strategy that sets goals throughout the different hospital areas based on what has been identified as important in the project's mission and vision. Quality is continuously improved using this approach which is based on active communication between management and workers. One of the principal features of this strategy is that it continuously assesses whether objectives have been met. It also has enormous potential to improve the clinical management of pharmacotherapy. With this in mind, the regional pharmacotherapeutic commission thought that prescription quality indicators in specialist care would improve and unwanted "induced" prescriptions would be reduced by implementing a policy of MBO, based on the activity of the abovementioned commission and the commitment of the hospital's management. In accordance with these initiatives, the hospital's management has incorporated an improvement plan in the hospital's global MBO strategy since 2005. This plan is based on achieving specific objectives for certain prescription quality indicators.

The aim of this study is to check how far these objectives have been met by measuring the evolution of the quality indicators of specialist care prescriptions on discharge and in outpatient consultations over the 4 years that the quality improvement plan has been in force.

Material and method

Study design

A longitudinal prospective quasi-experimental intervention study on drug prescriptions in SC was conducted. A series of specific prescription indicators were monitored in order to evaluate how effective the intervention was. Two groups of doctors (experimental and control), depending on whether they were attached to the hospital where the MBO strategy was implemented (hospital A) or not (hospital B), were set up for some of these indicators. Hospital A is the region's reference public hospital. It is a university hospital with 450 hospital beds, all the medical and surgical specialties, including organ removal. It is the only hospital authorised to transplant bone marrow and the cornea and has an emergency department that sees an average of 250 cases per day. Hospital B is a smaller, private centre that does not have an emergency department, although it does also have different medical and surgical specialties, most importantly psychiatry, which is not in hospital A.

Assessment of the prescription quality and observations

An *ad hoc* working group was set up to assess the quality indicators, which included a hospital pharmacist, a primary care pharmacist, the medical director of hospital A and the PC management. The group used the prescription quality standard that the *Institut Català de la Salut* (Catalan Health Institute) has implemented in primary health care as a

reference in order to select which prescription indicators to monitor and which objectives to meet.⁸ The aim of this standard is to promote the extensive use of drugs with a proven efficacy and safety (therapeutic utility), the selective inclusion of new therapies that add value to those already available and the use of more efficient pharmacotherapeutic alternatives, for example generic drugs.

The indicators that have been measured to assess the prescription quality are shown in Table 1. We started to monitor indicator 1 in 2003 and 6 measurements were taken at intervals of one year (two before the intervention and four during the four years the plan was in force). The objectives for improving prescriptions for indicators 1, 2 and 3 became part of the MBO framework in 2005 only in hospital A and every year more demanding goals were set. Therefore, the period from 2003 to 2004 will be taken as the pre-intervention reference period. We did not start to monitor indicator 2 until 2005 and therefore, there was no pre-intervention period for this indicator.

Interventions

The quality group has been analysing the indicators and applying the quality cycle since 2005: assessment, identifying opportunities for improvement, implementing corrective actions (MBO) and re-assessment. Although the assessment was carried out constantly during the whole year, the opportunities for improvements were put forward once a year. The opportunities for improvement were focussed on departments, units, and even individual specialists who achieved worse results. The impact of their induced prescription was also taken into account. In hospital A, these opportunities were translated into specific objectives that the hospital's medical management agreed on with the heads of units and/or relevant medical managers. Specific supplementary payment was linked to achieving these objectives.

Table 1 Quality prescription indicators assessed during the study period

Indicators	Calculation formula	Note
<i>Indicator 1: %of generic drugs</i>	$\frac{\text{Packages of generic drugs dispensed} \times 100}{\text{Total packages dispensed}}$	Generic drugs are taken to be the drugs authorised as such by the Ministry of Health and included in the Spanish official index of drug names
<i>Indicator 2: %New therapies with no added value (NTWAV)</i>	$\frac{\text{Packages of NTWAV dispensed} \times 100}{\text{Total packages dispensed}}$	NTWAV were considered as the drugs that have been commercialised in the previous 5 years and have been classified by the CANM* and other assessment centres as: 1. not assessable due to lack of information or; 2. do not result in any therapeutic advance
<i>Indicator 3: %recommended ACEi</i>	$\frac{\text{Patients with recommended ACEi} \times 100}{\text{Total patients with ACEi and ARBII}}$	The ACEi that appear in the <i>Guía Farmacoterapéutica y de Intercambio Terapéutico</i> are considered as recommended ACEi: captopril, enalapril and lisinopril

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Data source and analysis

All the prescriptions issued in the health region by doctors in the health care system and dispensed in pharmacies are registered on the Catsalut IT system. The indicators were measured every year and were calculated by taking into consideration all the prescriptions that had been dispensed and which were assigned to specialist doctors, including resident doctors. The evolution of indicator 1 was measured in hospital A from 2003 to 2008 and we compared the pre-intervention value with the post-intervention value for this indicator. The 2005, 2006 and 2007 values for indicator 1 were also compared for hospital A and B. The values of indicator 2 were also compared for hospital A and B for two consecutive annual measurements (2006 and 2007). Finally, indicator 3 was only measured in hospital A and we compared the pre-intervention value (2003) with the final post-intervention value (2008). In all the cases, a chi-square test was used to find out whether the difference between the measurements was statistically significant.

Results

Between 2003 and 2008 a mean of $154\,727 \pm 14\,068$ prescriptions were issued per year in hospital A with the number of prescriptions increasing every year (Table 2). In the same period hospital B issued fewer prescriptions ($73\,455 \pm 9\,782$) showing a clear downward trend in this hospital every year (Table 2). Figure 1 shows the evolution of the indicator for generic drug prescriptions in hospital A, where objectives for improvement were implemented through MBO. The prescription of generic drugs by the hospital's doctors had been increasing constantly since the baseline period (2003 and 2004). After introducing the MBO in different departments, the annual growth differential went from 1.39 in the baseline period to 4.88 in 2007 compared with 2006. The level of generic drug prescriptions was 2.45 times higher in 2008 than in the pre-intervention period (2003). The difference between the last year of intervention (2008) and the first year of the pre-intervention period (2003) was statistically significant ($P < .001$) for this indicator. The progression of the indicator for generic drug prescriptions in hospital A and B is compared in Figure 2. It grew in both centres, although its value was always higher and grew faster in hospital A, especially in 2007.

Table 2 Evolution of the number of prescriptions issued by the specialists of both hospitals

Year	Hospital A	Hospital B
2002	132 014	77 950
2003	147 017	93 884
2004	148 741	70 398
2005	153 537	70 392
2006	159 778	67 281
2007	167 778	67 034
2008	174 187	67 249

The variation of indicator 2 in hospitals A and B in the two-year period 2006-2007 is compared in Figure 3. We found that this indicator followed the opposite pattern to indicator 1. It is important to remember that since 2005, a maximum limit of 5% has been set for this indicator in Catsalut's public service contract with public health hospitals: hospital A complied with this requirement in 2007 while hospital B did not meet this requirement in either of the 2 years. The amount the indicator decreased in hospital A was statistically significant ($P < .001$).

Indicator 3 is qualitative and measures the percentage of patients with ACE inhibitors found in the prescription guidelines over the total number of patients with ACE+ARBII.

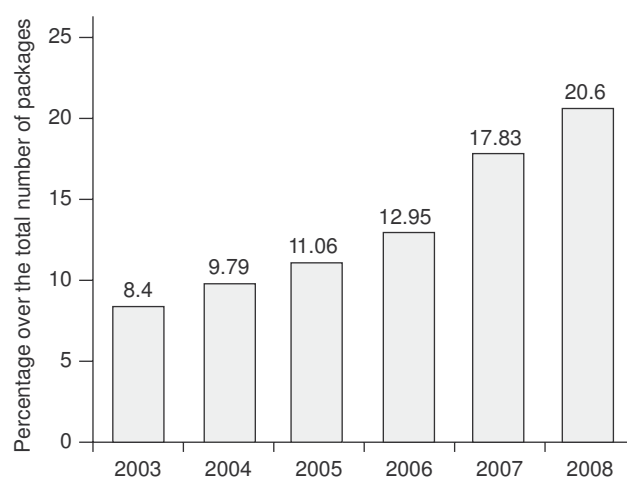


Figure 1 Evolution of indicator 1 (generic drug prescription) in hospital A during the study period.

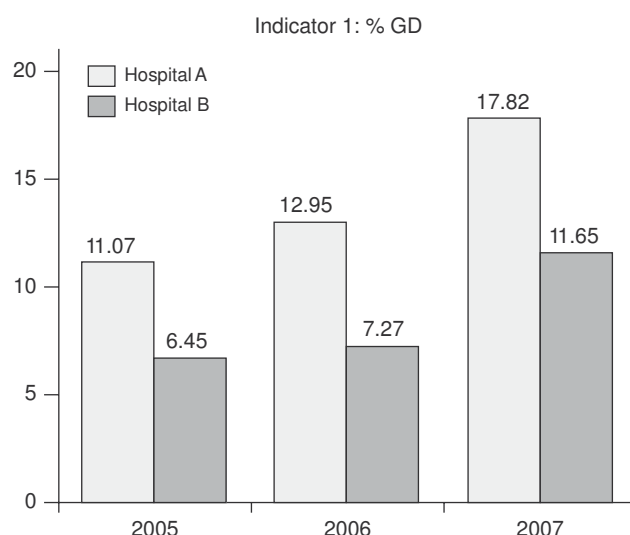


Figure 2 Values for indicator 1 (generic drug prescription as a % of total prescriptions) in the intervention hospital A and control hospital B. Differences between A and B were always statistically significant $P < .001$. GD indicates generic drugs.

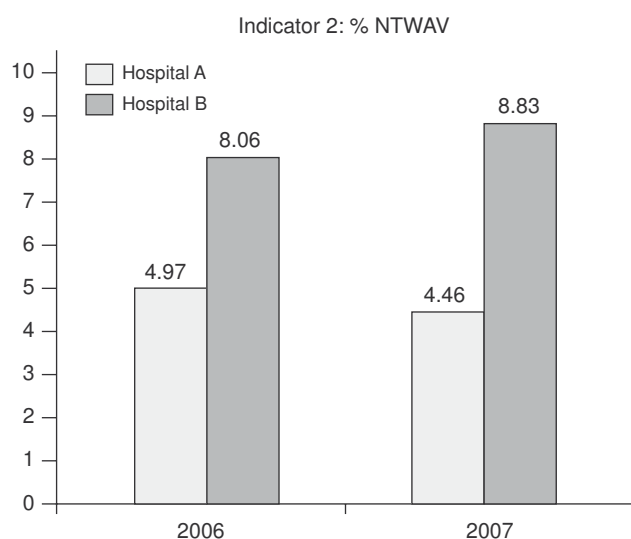


Figure 3 Values for indicator 2 (prescription of NTWAV as a % of total prescriptions) in the intervention hospital A and control hospital B. Differences between A and B were always statistically significant $P < .001$. NTWAV indicates new therapies with no added value.

This indicator had a value of 37% (637/ 1732) in the pre-intervention period (2003) while it reached a value of 47% (1059/ 2242) in 2008, after the intervention had been in place for 4 years. The increase was statistically significant ($P < .001$).

Discussion

From the results presented, it is possible to confirm the hypothesis that the quality of prescriptions on discharge and in specialist outpatient consultations is improved by implementing a MBO strategy and incentive-based activities to assess and improve prescriptions. It increased generic drug prescriptions and decreased prescriptions of new therapies with no added-value (NTWAV). No study published had analysed the impact that a strategy of this type has on drug prescription quality in SC before this study. However, some preliminary studies seemed to indicate that prescription indicators have a positive evolution when objectives for improvement are agreed on with health care departments in the framework of a service contract.⁸ It is known that different health care departments have had policies of this type in place in the PC area for a number of years⁹ and that this aggravated the problem with prescriptions “induced” from specialised care. This is especially true when this does not comply with the parameters that the PC doctor must fulfil for prescriptions. In general, “induced” prescriptions account for 25%–30% of all prescriptions that PC doctors issue and, in about 10%–15% of these cases, the PC doctors may not agree with the “induced” prescription.¹⁰ Therefore, NTWAV indicator may provide a more faithful indication of the volume of unwanted induced prescriptions, especially if we consider that specialists are more likely to prescribe the latest therapies

to arrive on the market and that the NTWAV indicator includes most of the drugs that are not recommended by the quality standards used in PC.^{10,11}

Explicit incentives or objective-based incentives have been systematically reviewed and it was found that there is very little high-level evidence supporting their usefulness.¹² However, the few clinical trials that have been carried out and some observational studies highlight that these financial incentives affect how doctors use some resources and increase the quality of medical care according to previously defined criteria.¹³ In Spain, the introduction in many regions of incentives to meet certain objectives for prescriptions seems to have had a significant impact, at least in the percentage of generic drug prescriptions.¹⁴ In this way, the percentage of generic drug prescriptions increased by 89.13% between 2004 and 2007. This impact was also seen in our study in the hospital where the intervention was made. The hospital achieved a level of generic drug prescriptions that was comparable with the average in the Spanish health system as a whole, which is around 20%. However, there seems to be other factors that caused this indicator to increase as generic drug prescriptions also progressively increased in the hospital without MBO. In our study the most significant qualitative impact of the MBO strategy can be seen in the improvement of the NTWAV indicator. In this case, the impact of the strategy does seem to be decisive as the indicator worsened in the centre where the strategy was not applied. This is especially relevant as the NTWAV indicator is more closely linked to the concept of rational use of drugs than the indicator of generic drugs, which focuses more on financial aspects. The percentage of patients with ACEi recommended by the regional pharmacotherapeutic guidelines is also an indicator of rational use and in this case it shows the level of acceptance of these guidelines. It is highly likely that the fact that the specialists of hospital A participated in selecting the recommended drugs had a decisive effect on the improvement of this indicator after the MBO was applied.

Other strategies have been described in the SC area, but especially in PC and old people's homes, and some of them are associated with the use of generic drugs.^{15–17} Most of these strategies combine written informative material and methods based on personalised interviews in order to improve prescription quality. These strategies are considered to be the most effective strategies to date.¹⁸ In general, these strategies limit spending and improve quality indicators, including generic drug prescription, although incentives seem to have a more significant impact, according to the results published.¹⁷ Information-based strategies are not incompatible with the use of objective-based incentives; on the contrary, the use of an MBO in the area of prescriptions on discharge or in outpatient consultations must be accompanied by clear and detailed information to professionals describing the reasons and motives on which the objectives proposed are based. The objectives were originally presented and explained to the heads of departments in our health care region and informative sessions were carried out for all the levels of the most relevant departments. It may be possible to reduce the scepticism or even the contempt that medical specialist have for this type of interventions by

providing them with information and the motives behind them.¹⁹

Quasi-experimental research is especially appropriate for assessing strategic changes in health care because the changes are applied to whole populations (in our case to doctors) and randomisation is logistically impossible. These studies have the same limitations as non-randomised observational designs in which it is difficult to make comparisons between groups. This may distort the results as the centres are not randomly assigned to the study groups and there may be variations in the seriousness or rate of morbidity in the hospitals. Administrative errors when assigning the prescription receipt books to the doctors making the prescription may also distort the results. However, the quantitative volume of prescriptions, the close time relationship between intervention and effect as well as the differences observed between both hospitals suggests that the results are acceptable. Furthermore, we used the interrupted time-series design with a control group, which is the most robust design in the area of quasi-experimental studies.²⁰ This approach is especially suitable for abrupt interventions (in this case a change in the management strategy: not apply/ apply the MBO). Time series are analysed in a similar way to before-and-after designs but they also include multiple observations before and after the change.

The objectives of PC and SC with regard to rational drug use were aligned by applying different strategies simultaneously, which include the following: firstly, coherence between the two health care levels as far as the objectives of rational prescription are concerned; secondly, independent information on new therapies; thirdly, personalised information to the specialists on the results of the prescription quality indicators; and fourthly, use of incentives at both health care levels for meeting the improvement objectives. The fact that there is a regional pharmacotherapeutic commission linked to the hospital's commission contributes significantly to an integrated pharmaceutical policy. This commission helps to coordinate/ align the improvement objectives in primary and specialised care and links the prescription results to the management by objectives of the hospitals and health centres. Analysing the specialist's prescriptions and creating quality indicators is a basic tool of integrated management to control pharmaceutical expenditure, the rational use of drugs and treatment continuity.

Conflict of interest

The authors affirm that they have no conflict of interest.

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