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Brief original article

The value of comparative research in major day surgery

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ABSTRACT

Objective: To measure time trends in major day surgery rates according to hospital ownership and other hospital characteristics among the providers of the public healthcare network of Catalonia, Spain.
Method: Data from the Statistics of Health Establishments providing Inpatient Care. A generalized linear mixed model with Gaussian response and random intercept and random slopes.
Results: The greatest growth in the rate of major day surgery was observed among private for-profit hospitals: 42.9 (SD: 22.5) in 2009 versus 2.7 (SD: 6.7) in 1996. These hospitals exhibited a significant increase in major day surgery compared to public hospitals (coefficient 2; p-value <0.01)
Conclusions: The comparative evaluation of hospital performance is a decisive tool to ensure that public resources are used as rationally and efficiently as possible.

El valor de la investigación comparativa en cirugía mayor ambulatoria

Palabras clave:
Investigación sobre servicios de salud
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Hospitales públicos
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RESUMEN

Objetivo: Medir la evolución temporal de la cirugía mayor ambulatoria entre los proveedores de la red sanitaria pública de Cataluña de acuerdo con la titularidad y otras características de los hospitales.
Métodos: Con datos provenientes de la Estadística de Establecimientos Sanitarios con Régimen de Internamiento, se realizó un modelo lineal generalizado mixto con respuesta gaussiana y pendiente e intersección aleatorios.
Resultados: Se observó que la mayor variación en la tasa de cirugía mayor ambulatoria era para los hospitales privados con fines de lucro: 42,9 (desviación estándar [DE]: 22,5) en 2009 frente a 2,7 (DE: 6,7) en 1996. Estos hospitales tuvieron un aumento significativo de la cirugía mayor ambulatoria en comparación con los hospitales públicos (coeficiente 2; p <0,01).
Conclusiones: La evaluación comparativa del desempeño de los hospitales es una herramienta decisiva para garantizar que los recursos públicos se utilizan de la forma más racional y eficiente posible.

Introduction

The number of studies assessing efficiency, competiveness and quality of care in both the public and private health sectors has risen considerably over the last three decades. Evidence shows that many countries have increased private involvement in the governance, financing, management and provision of the public health system during this time.[1] It has been particularly visible in countries with established National Health Systems (NHS).[2] In Spain, since the early 1980s, the decentralization of the NHS to autonomous regions has produced an uneven entrance of private providers into the public health system. In Catalonia (Spain), the health system has been characterized by a division of public financing and provision functions, and healthcare provision is currently the responsibility of a wide range of public and private contracted providers.

Overall, these processes illustrate that the fine line between public and private seems often blurred, since the access to profitability has created communicating vessels from public to private spaces. In this regard, outpatient surgery performed in private centres represented a growing share of all surgical operations performed for the public health systems of many countries. Outpatient surgery has very specific characteristics, for example, it is estimated that hospital costs are 25-68% lower than for surgery performed on an inpatient basis,[3] it has high technology needs and the health outcomes are positive (e.g., complications are usually minor).

Some studies have analysed outpatient surgery activity by different NHS providers. However, the analysis was limited to a small number of surgical interventions, undertaken by few providers[4]

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Table 1
Hospital characteristics of the study sample in 1996 and in 2009.

	1996								2009							
	Public (n = 9)		Other public (n = 11)		Private not-for-profit (n = 17)		Private for-profit (n = 12)		Public (n = 8)		Other public (n = 16)		Private not-for-profit (n = 14)		Private for-profit (n = 10)	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Number of beds																
<250	3	33.3	4	36.4	12	70.6	11	91.7	2	25.0	9	56.3	10	71.4	8	80.0
251-600	4	44.4	5	45.5	4	23.5	1	8.3	3	37.5	5	31.3	3	21.4	2	20.0
>601	2	22.2	2	18.2	1	5.9	0	0.0	3	37.5	2	12.5	1	7.1	0	0.0
Number of doctors																
<150	6	66.7	7	63.6	16	94.1	11	91.7	1	12.5	7	43.8	9	64.3	8	80.0
151-300	1	11.1	3	27.3	0	0.0	1	8.3	2	25.0	5	31.3	3	21.4	1	10.0
>301	2	22.2	1	9.1	1	5.9	0	0.0	5	62.5	4	25.0	2	14.3	1	10.0
Number of interns																
<15	3	33.3	6	54.5	15	88.2	11	91.7	1	12.5	7	43.8	9	64.3	8	80.0
16-90	3	33.3	4	36.4	1	5.9	1	8.3	1	12.5	5	31.3	4	28.6	1	10.0
>91	3	33.3	1	9.1	1	5.9	0	0.0	6	75.0	4	25.0	1	7.1	1	10.0
Number of high technology devices																
<2	5	55.6	9	81.8	15	88.2	12	100.0	3	37.5	13	81.3	13	92.9	9	90.0
3-10	4	44.4	2	18.2	1	5.9	0	0.0	4	50.0	2	12.5	0	0.0	1	10.0
>11	0	0.0	0	0.0	1	5.9	0	0.0	1	12.5	1	6.3	1	7.1	0	0.0
Major day surgery																
Mean (SD)	16.6	(21.0)	13.6	(11.0)	13.7	(14.0)	2.7	(6.7)	35.1	(13.0)	49.3	(12.0)	46.4	(11.0)	42.9	(22.0)

SD: standard deviation.

and tracking short periods of time.[5] Moreover, despite the importance of the time trend analyses for evaluating the hospital performance few studies have investigated the relationship to the hospital characteristics.[6]

In Catalonia, recently, a descriptive study has been published analysing the outpatient surgery, however they have not considered the tendency analysis to compare the performance along the time, also they do not distinguish between the providers of the public healthcare network (other public hospitals, private-not-for-profit hospitals and private-for-profit hospitals).[7] This study aims at measuring longitudinal data from 1996 to 2009 on major day surgery rates among the providers of the public healthcare network of Catalonia. The longitudinal analysis will provide a more robust model to observe hospital patterns of change.

Methods

Settings

The Ministry of Health in Spain has the mandatory and publicly accessible database called Statistics of Health Establishments providing Inpatient Care (ESCRI in its Spanish initials). It has generated information maintaining consistency and methodological homogeneity over time, and although it only ensures comparability within autonomous regions, it is possible to obtain a completely homogeneous series of the public healthcare network of Catalonia covering the period 1996-2009.

Design, data source and variables

This was a longitudinal retrospective study of hospitals in the Catalan Public Hospital Network from 1996 to 2009. Data for this study came from the ESCRI. The sample was made up of all acute care hospitals belonging to the Catalan Public Hospital Network with 75% or more publicly funded discharges, registered in the ESCRI between 1996 and 2009. One hospital, with data for only one year, was excluded from the analysis. The sample size had two dimensions: the number of experimental units (hospitals) and the number of observations per experimental unit (years).

The indicator analysed was the global major day surgery rate per 100 operations. Construction of the indicator and variables of hospital characteristics (number of beds, number of high technology devices, total number of physicians and total number of medical interns) were based on the recommendations of the Ministry of Health.[8,9]

Hospital ownership was classified according to Saltman[10] and the information available in the ESCRI as: 1) public: the Catalan Health Institute; ii) other public: provincial and municipally-owned public hospitals; iii) not-for-profit: private-not-for-profit hospitals; and iv) for-profit: private-for-profit hospitals. The hospitals are unequally distributed around the territory, public hospitals are concentrated in the provincial capitals and the majority are high-complexity hospitals. The other hospitals are scattered about the region and the majority are basic general hospitals or referral hospitals.[11]

Statistical analysis

A generalized linear mixed model (GLMM)[12] with Gaussian response and random intercept and random slopes was fitted to test our hypothesis that the hospitals had different levels of and time trends in major day surgery rates, according to their ownership and other hospital characteristics. The model took of account the repeated observations from each hospital over the whole time period and was adjusted for the number of beds, and numbers of high technology devices, of physicians, and of interns. The slope of the weighted line is interpreted as a composite estimator for the annual variation of the outcome variable.

The threshold to include or exclude the variables in the model was 5% significance for the ANOVA test, except when the Akaike information criterion worsened.[12] Finally, the model was validated employing residual analysis. The analyses were performed using the free software, R v.3.0.3.

Results

Characteristics of the hospitals at the beginning and the end of the study period were found to be largely similar in the two time-periods (Table 1). Greater differences in major day surgery

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