

Influence of available resources on medical practitioners' decision-making process and practice: study of a reference hospital emergency department

Juan Viñas Salas / Ramón Casals Garrigó / Ana M. Jiménez Vilchez / Pere Godoy
 Arnau de Vilanova University Hospital, School of Medicine, University of Lleida, Lleida, Spain.

(Influencia de los recursos disponibles en la práctica clínica: estudio en una unidad de urgencias de un hospital de referencia)

Abstract

Objective: To evaluate variations in the observation period in the emergency department (ED) in response to bed availability.

Methods: A quasi-experimental pre-test post-test study without a control group was conducted in the ED observation ward over 2 1-month periods. During this time the only variable that changed was the number of beds available, which decreased from 20 (pre-test period) to 16 (post-test period).

Results: The ED attended 7,725 patients: 3,706 patients in pre-test period, 335 of whom were admitted to the observation ward, with an average length of stay of 1,105.4 minutes per patient, and 4,019 patients in post-test period, 570 of whom were admitted to the observation ward, with an average length of stay of 686.1 minutes per patient ($p < 0.001$). There was no variation in mortality, re-admissions or complaints.

Conclusions: A reduction in bed availability for observation purposes shortens patient length of stay.

Key words: Health care management. Emergencies. Resources. Health care quality.

Resumen

Objetivo: Evaluar la variación del indicador "período de tiempo de observación" dedicado a cada paciente, en respuesta a una reducción del número de camas disponibles.

Métodos: Se realizó un estudio «quasiexperimental preprueba postprueba» sin grupo control en una unidad de urgencias durante 2 períodos de un mes. En este tiempo el único cambio fue el número de camas disponibles, que disminuyeron de 20 (período A) a 16 (período B).

Resultados: El servicio de urgencias atendió a 7.725 pacientes: 3.706 pacientes en el período A, 335 de los cuales fueron admitidos en la unidad de observación con una estancia media de 1.105,4 minutos por paciente; y 4.019 pacientes en el período B, 570 de los cuales fueron admitidos en la unidad de observación con una estancia media de 686,1 minutos por paciente ($p < 0,001$). No hubo variaciones en la mortalidad, readmisiones o quejas.

Conclusiones: Una disminución en el número de camas disponibles para observación comporta una reducción en el tiempo de estancia de los pacientes.

Palabras clave: Gestión de servicios sanitarios. Urgencias. Recursos. Calidad de los servicios de salud.

Introduction

The excess health care load currently borne by hospital accident and emergency departments (A&ED) can be traced to a multitude of causes^{1,2}. The demand faced by such services is generated by end-users, who are in turn influenced by a variety

of factors³⁻⁵: unlimited accessibility to these services; use of emergency services as a «side door» into the health care system; and the public's tendency to overestimate hospital-based medical attention to the detriment of other levels of medical assistance^{1,3}. With regard to end-user-specific factors, social vulnerability, poverty and alcoholism have been shown to act as independent predictors of frequent hospital use^{1,3}. In all, this makes for inappropriate and inefficient use of such services, as has indeed been highlighted in a number of studies⁴.

In this context, a multitude of clinical situations are generated which must be tackled under conditions of high levels of uncertainty, thus explaining the variation observed in medical practice^{1,3-5}.

Correspondence: Juan Viñas Salas.
 Pintor Benseny, 7. 25008 Lleida. Spain.
 E-mail: vinyes@cirurgia.udl.es

Received: 13 October 2005.
Accepted: 1 December 2006.

This study sought to determine the influence of a reduction in available health care resources (number of observation ward beds) on the clinical practice of medical practitioners staffing the emergency department of a reference hospital, with special reference to the indicator «observation period» devoted to each patient.

Methods

This was a quasi-experimental pre-test post-test study without a control group and was carried out over 2 months at the A&ED of the Arnau de Vilanova University Hospital. This is a 435-bed reference facility located in the Lleida Public Health District (Spain) whose catchment area has a population of 350,000.

The A&ED has 4 primary care units for patients with medical-surgical pathology, 4 units for patients with traumatic pathology, plus two paediatric units and one gynaecology unit. This A&ED is equipped with an observation ward with a capacity for 20 patients. Patients are transferred there while awaiting results, recovering from emergency treatment and pending discharge from hospital, or merely waiting for an in-hospital bed.

A&ED medical records at Lleida's Arnau de Vilanova University Hospital were sourced for data on patient admissions for emergency attention during the months of February and April in 1998. This period was chosen because construction work carried out in this section of the building led to the existing 20-bed observation ward being closed and another 16-bed facility being opened in its place. For the whole period A the unit had 20 observation beds and the reduction of bed was conducted the last day of period A and remained stable for the rest of the study period. During both months, the department was manned by the same team of interns, staff physicians and nurses, and the same study protocols were in place. Likewise, the area's capacity to transfer patients was comparable, there being the same health care burden, a similar percentage of patients with the same pathology, and similar weather conditions for the two study months. Furthermore, the in-hospital bed occupation rate was close to 90%, very similarly to both periods of study and there weren't a different number of surgery procedures or different management system programme of patient waiting list. The patients were divided into two different groups: Group A: patients attended to in February, with a 20-bed capacity observation ward; and Group B: patients attended to in April, with a 16-bed capacity observation ward.

To control the temporal effect of respiratory infections and the differential importance of traumatic pathology between the both periods of study, patients were classified into these categories (respiratory and traumatic

pathologies) and for the rest of patients we used other 5 categories according with the service organization. Variables analyzed were: number of patients; most frequent principal pathologies, broken down into 7 categories, viz, respiratory, surgery, cardiac, digestive, urology, neurology and traumatology; respective lengths of stay in the observation ward; as well as outcome, complaints and re-admissions during 6-month follow-up. Furthermore, in May a self-administered questionnaire was sent to medical practitioners and health care staff who had attended the study patients, addressing possible variations in criteria, patient-care protocols and degree of satisfaction.

We carried out a bivaried analysis pre-test posttest. Association between qualitative variables was analyzed using the χ^2 test. Variance analysis was used to study the relationship between the qualitative and quantitative variables. In all cases, a significance level of 0.05 was accepted.

Results

During the 2 periods of the study, a total of 7,725 patients visited the A&ED. In February the department attended to Group A (20 beds), comprising 3,706 patients (48.0%), 335 of whom were subsequently transferred to the observation ward. In April the department attended to Group B (16 beds), comprising 4,019 patients (52.0%), 570 of whom were subsequently transferred to the observation ward. As regards the number of patients per pathology, proportions proved similar for the 2 periods analyzed, and overall, the differences were not statistically significant ($\chi^2 = 11.0$; $p = 0.09$). It has to be said however that in the detailed analysis broken down by subgroup, the month of February showed a higher proportion of patients in the group suffering from respiratory system disorders ($p < 0.01$) (table 1).

Table 1. Distribution of patients by pathology and study period

Pathology	Period A (February)		Period B (April)		χ^2	p ^a
	n	(%)	n	(%)		
Traumatology	58	(17.3)	129	(22.6)	3.64	0.056
Urology	12	(3.6)	29	(5.1)	1.11	0.294
Surgery	43	(12.8)	87	(12.3)	1.01	0.317
Digestive	29	(8.7)	40	(7.0)	0.81	0.369
Neurology	19	(5.7)	40	(7.0)	0.63	0.428
Cardiac	62	(18.5)	100	(17.5)	0.13	0.715
Respiratory	112	(33.4)	145	(25.4)	6.63	0.010
Total	335	(100)	570	(100)		

^ap value for χ^2 test.

Table 2. Breakdown of observation time (in minutes) in the observation ward by pathology and study period

Pathology	Period A (February)			Period B (April)			Test ANOVA	p ^a
	n	Total time	Mean time per patient	n	Total time	Mean time per patient		
Traumatology	58	18,560	320.0	129	41,280	320.0	0	1.00
Urology	12	4,095	341.2	29	8,595	296.4	2.23	0.03
Surgery	43	24,070	559.8	87	41,568	477.8	3.63	0.01
Digestive	29	37,687	1,330	40	41,940	1,048.5	4.10	0.01
Neurology	19	31,445	1,665	40	34,800	870.0	4.83	0.01
Cardiac	62	92,460	1,491.3	100	76,925	769.2	8.11	0.01
Respiratory	112	162,002	1,446.4	145	145,961	1,006.1	5.75	0.01
Total	335	370,319	1,105.4	570	391,069	681.1	14.17	0.01

^ap value for ANOVA Test.

Total observation time was slightly longer in April (391.1 minutes) versus February (370.3 minutes). In contrast, mean observation time per patient was far shorter in April (686.1 minutes) than in February (1,105.4) ($p < 0.0001$) (table 2). It should also be pointed out that the April mean observation times were shorter for all groups of pathologies studied, except for the trauma group in which the means for the 2 periods were identical (320 min).

No variation was observed in the number of complaints in the emergency department for these 2 periods. Similarly, there was no variation in re-admission or mortality rates, nor were any complaints registered by emergency department medical staff attending such patients. Moreover, in the May survey, medical staff reported no change in attitude or clinical practice protocol in this period.

Discussion

The idea underpinning the present study was to analyze the effect—in the absence of any change in any other parameter—of a sudden 20% reduction in the number of beds in the observation ward, on the decision-making process and clinical practice of medical staff.

This study provides evidence of the influence of the availability of an isolated structural factor (number of beds) on medical practitioners' decision-making process and clinical practice⁶⁻⁸. The carrying out of such a retrospective study had no influence on the therapeutic approach or clinical practice protocols followed by the emergency department medical staff, which was kept ignorant of the study objectives. They simply adapted to the new circumstances and generated a greater turnover of patients in the observation ward by discharging these patients at a faster rate. There was no decline in health care quality, as borne out by the fact that

the number of deaths and re-admissions remained the same, nor did patients feel worse treated, there being no rise in the number of complaints.

The study has certain limitations. It is a retrospective study in which two months elapsed between the 2 groups. While no pathology-specific differences were observed between the 2 study periods overall, February showed a higher proportion of patients in the respiratory disorders subgroup⁹. Despite the fact that the climatic conditions did not differ greatly for the 2 study months, February in Spain is well-known for being a period of influenza activity accompanied by a possible rise in demand. Nevertheless, mean observation time per patient was shorter for all pathologies (including respiratory disorders) in April versus February.

Of the factors which explain variations in medical practice, supply-side factors and those linked to the direct health care provider are the ones that might well play the most important role in this study¹⁰⁻¹³. Moreover, situations charged with a substantial element of uncertainty (as frequently happen in emergency departments) are those more likely to be influenced by different styles of clinical practice¹⁴.

Evidence of variability in the observation time allocated to emergency patients raises important questions concerning quality of care. In general, the recommended course of action in cases of variability in medical practice is to reduce unnecessary care^{13,14}. Another issue that deserves further research is the health outcome of patients admitted to hospital under high and low pressure situations, both globally and by specific categories¹⁴. The practical implications of this study are obvious: there is a need to investigate the standard period that must be devoted to patients in emergency wards with a similar level of complexity in order to correct situations that imply an excess or deficiency with respect to these standards.

The following conclusions can be drawn from our study. Under conditions of similar health care pressu-

re, a reduction in the bed space available for observation purposes in an emergency department leads to a shortening in patients' length of stay, a higher patient/bed turnover, and an ensuing increase in the number of patients kept under observation. Furthermore, available resources exert a significant influence on the decision-making processes of medical practitioners, who adapt –albeit unconsciously– to available resources by modifying their clinical practice.

Acknowledgments

The authors would like to thank: the secretary of the Emergency Department of the Arnau de Vilanova University Teaching Hospital, Ms. María José Moya, for her invaluable help with the gathering of data; and the entire medical team, interns and members of staff, on duty in the emergency department during the study period.

References

1. Peacock WF, Young J, Collins S, Diercks D, Emerman C. Heart failure observation units: optimizing care. *Ann Emerg Med.* 2006;47:22-33.
2. Christenson J, Innes G, McKnight D, Thompson CR, Wong H, Yu E, et al. A clinical prediction rule for early discharge of patients with chest pain. *Ann Emerg Med.* 2006;47:1-10.
3. Azpiazu JL. Los frequentadores de los servicios de urgencias. *Med Clin (Barc).* 1997;108:737-8.
4. Young GP, Wagner MB, Kellermann AL, Ellis J, Bouley D. Ambulatory visits to hospital emergency departments. *JAMA.* 1996;276:460-5.
5. Steinbrook R. The role of emergency department. *N Engl J Med.* 1996;334:657-8.
6. Sánchez M, Miró O, Coll-Vinent B, Bragulat E, Espinosa G, Gómez-Angelats E, et al. Saturación del servicio de urgencias: factores asociados y cuantificación. *Med Clin (Barc).* 2003;121:167-72.
7. Fernández Moyano A, Callejas Rubio JL, Paredes García MI, Navarro Hidalgo D. Tiempos de espera y calidad asistencial en urgencias. *Med Clin (Barc).* 2001;117:559.
8. Peiró S, Meneu R, Roselló ML. Validez del protocolo de evaluación del uso inapropiado de la hospitalización. *Med Clin (Barc).* 1996;107:1124-9.
9. Mangtani P, Hajat S, Kovats S, Wilkinson P, Armstrong B. The association of respiratory syncytial virus infection and influenza with emergency admissions for respiratory disease in London: an analysis of routine surveillance data. *Clin Infect Dis.* 2006;42:640-6.
10. González-Montalvo JL, Baztán JJ, Rodríguez-Mañas L. Ingreso hospitalario urgente: factores sociales asociados y sus diferencias en función de la edad. *Med Clin (Barc).* 1994;103:441-4.
11. Jha AK. Measuring hospital quality. What physicians do? How patients fare? or Both? *JAMA.* 2006;296:95-7.
12. Marión Buen J, Peiró S, Márquez Calderón S, Meneu de Guillerna R. Variaciones en la práctica médica: importancia, causas e implicaciones. *Med Clin (Barc).* 1998;110:382-90.
13. Ellis J, Mulligan I, Rowe J, Sackett DL. Inpatient general medicine is evidence-based. *Lancet.* 1995;346:407-10.
14. Katz DA, Williams GC, Brown RL, Aufderheide TP, Bogner M, Rahko PS, et al. Emergency physicians' fear of malpractice in evaluating patients with possible acute cardiac ischemia. *Ann Emerg Med.* 2005;46:525-33.