

Assessing Hospital Performance by the Pabon Lasso Model

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Abstract

Background: The Pabon Lasso model was applied to assess the performance of six State-run hospitals in the province of Kohgiluyeh & Boyer-Ahmad, to produce information that used by policy makers in their attempt to make the health care system more productive.

Methods: This cross-sectional study involved all the six public hospitals in the province, with 607 registered beds. Data collection accomplished by the use of two ad hoc questionnaires that dealt with both general information and admission data from various hospital wards. The statistical software SPSS-13 used to derive three basic performance indicators, namely average length of stay, bed occupancy rate and bed turnover, which analyzed in Pabon Lasso model.

Results: The overall average length of stay, bed occupancy and bed turnover rates were 2.99 days, 62.78% and 76.73 respectively. Two hospitals were in Zone III of the model, indicating a satisfactory level of efficiency. Three hospitals demonstrated inefficiency and underutilization of resources by falling into Zone I. one hospital placed in Zone IV.

Conclusion: The best approach to address the existing inefficiencies would lie in stopping the expansion of the current facilities (e.g. not adding any more beds). As any further expansion will only serve to make hospitals more inefficient. Future research should focus on why the performance is not at a desirable level and how the situation can be improved.

Keywords: Performance evaluation, Hospital, Pabon lasso, Iran

Introduction

State-run hospitals constitute an important component of the health care system in developing countries, and they account for up to 50% of the total cost of health care (1, 2). The health needs of an ageing population and the epidemic in non-communicable diseases together with the increasing costs of diagnostic and treatment procedures are placing unprecedented demands on public hospitals, making it extremely crucial to assess these institutions with regard to their efficiency in allocating scarce resources (3-6). Over the last few decades, health providers in the public sector have focused heavily on developing human resources and expanding their physical infrastructure (hospitals, clinics, laboratories). Their efforts have led to greater and more eq-

uitable access to health care as well as better control of communicable diseases. However, problems traditionally associated with these hospitals- such as technical and professional inefficiencies, failure to meet consumer demands and lack of access for the poorer sections of the population- are now posing a major challenge for makers at regional and national level (7).

The hospital's function at the community level depends on the status it is given by policy makers. Performance assessments can provide managers with the information they need for evaluation and monitoring of the hospital's current status and activities. This is a largely neglected area in the research aimed at attaining greater efficiency in health care (8).

Several approaches been proposed for assessing hospital performance and using the results of such assessment (9). The Pabon Lasso model has proved to be one of the most useful for comparing the performance of different hospitals or different wards within the same hospital. This model uses three indices- namely bed turnover (BTO), bed occupancy rate (BOR), and average length of stay (ALS)- to make an overall assessment of performance (10). The Pabon Lasso graph divides hospitals into 4 categories:

1. Hospitals with low bed turnover and low bed occupancy rates indicating a surplus of hospital beds relative to the existing demand (Zone 1).
2. Hospitals with high BTO and low BOR (Zone 2). Characterized by unnecessary hospitalizations, an oversupply of beds, or the use of beds for simply observing patients.
3. High BTO and high BOR (Zone 3) characterize hospitals that have reached an appropriate level of efficiency, with relatively few vacant beds at any time.
4. Hospitals in Zone 4 have low BTO and high BOR; these either are serving patients with serious, chronic illnesses or have an unnecessarily long ALS.

This type of analysis been used for quick identification of poorly performing hospitals and finding appropriate strategies to correct the inefficiency (11-14). In addition to positive outcomes in short term, investments aimed at improving hospital efficiency have the added benefit of assisting the transfer of scarce resources to more cost-effective interventions in the ambulatory care or primary care settings.

The province of Kohgiluyeh & Boyer-Ahmad is located in south-western Iran and is home to a population of over 620000. It contains cities, namely Yasuj, Gachsaran, Dehdasht, Dena, and Likak. There are 6 hospitals in the province, including 3 teaching and 3 non-teaching hospitals, whose distribution is as follows: 3 hospitals in Yasuj, 2 in Gachsaran, and 1 in Dehdasht. There are no hospitals in Dena or Likak.

Over the last few decades, the development of health care services in the province of Kohgiluyeh

& Boyer-Ahmad (KB) has been of a predominantly quantitative nature (as part of a strategy to improve the function of the health service delivery system), without any serious assessment of its efficiency.

The present research used the Pabon Lasso model to assess the current situation and identify strategies to help regional hospitals achieve a higher level of performance. The study provides policy makers with a realistic assessment of the current situation and a strategy towards a more efficient use of the existing health service resources.

Material and Methods

This cross-sectional study in 2006 (from March 2005 to March 2006) involved a total of 607 beds in six teaching and non-teaching hospitals, namely Shahid Beheshti, Shahid Raja'ei, Emam-Sajjad hospitals in Yasuj, Shahid Raja'ei and Be'sat in Gachsaran, and Emam-Khomeini Hospital in Dehdasht). Apart from Be'sat Hospital, which governed by the Iranian Oil Company, the remaining hospitals are all administered by the Province's University of Medical Sciences. Those based in Yasuj are teaching hospitals and others are non-teaching establishments. With the exception of Raja'ei Psychiatric Hospital (Yasuj), the other hospitals all provide general medical care. Data collection was performed with the use of two-ad hoc questionnaires constructed based on a comprehensive literature review. The first questionnaire dealt with general data such as the total number of beds, number of active beds, number of hospital wards, etc. The second questionnaire focused on data from hospital admission and discharge units, including bed occupancy rates, number of admissions, number of patients discharged, and number of deaths. Data for this study extracted from computerized databases within the hospitals' Admission and Discharge units. In coordination with the managers and admission authorities, trained interviewers from the research team collected the relevant data and took the necessary action in cases of incomplete or inadequate data. We stored these data in an SPSS (v.13) file

and performed statistical analyses to derive the three performance indices that were the focus of this study, namely average length of stay (ALS), bed occupancy rate (BOR), and bed turnover (BTO). Indices calculated for the KB province as a whole and for individual hospitals.

The emergency, maternity (labor), dialysis, and thalassemia units usually deliver services that fall outside the range of what regarded as routine medical care and thus data from these sections can have a confounding effect in hospital performance studies. Accordingly, these data excluded from all statistical analyses. Indices calculated at hospital and province level placed on a Pabon Lasso graph and further analysis of the results was done based on each of six hospital's relative position on this graph.

Results

The performance of various hospital wards and sections (within individual hospitals and on the province level) been summarized in Table 1. The table presents data on the number of active beds, active bed-time, occupied bed-time, and the number of discharges (including deaths). The highest and lowest number of active beds belonged to Emam-Khomeini Hospital in Dehdasht and Raja'ei Psychiatric Hospital in Yasuj, respectively. There were a total of 552 active hospital beds in the province, and if we take census data

from 2006, we can use the province population of 634299 to arrive at the average figure of 0.87 hospital beds per 1000 local population.

Table 2 summarizes performance indices for both KB Province and individual hospitals in 2006. As for the whole province, the average length of stay was 2.99 days, while bed occupancy and turnover rates were 62.78% and 76.73, respectively. Excluding Raja'ei Psychiatric Hospital (because of the different type of health care provided by this hospital), the highest ALS figure was observed in Be'sat Hospital. The maximum and minimum BOR belonged to Emam-Khomeini Hospital in Dehdasht and Be'sat Hospital, respectively; the same two hospitals had the highest and lowest BTO figures.

Fig. 1 illustrates the performance of the six hospitals in a Pabon Lasso model (the index lines run through the average BOR and BTO values for the entire province). It can be seen that Raja'ei Psychiatric Hospital is in Zone 4, Emam-Sajjad and Emam-Khomeini fall in Zone 3, and Beheshti, Raja'ei General and Be'sat hospitals are located in Zone 1 of the graph. None of the six hospitals fell in Zone 2. Excluding Raja'ei Psychiatric Hospital did not change the position of the other hospitals on the Pabon Lasso graph, so we did not exclude it from our data.

Table 1: Data on the performance of inpatient wards in individual hospitals, Kohgiluyeh & Boyer-Ahmad Province, Iran, 2006

	Beheshti Yasuj	Raja'ei Yasuj	Emam- Sajjad Yasuj	Raja'ei Gachsaran	Emam- Khomeini Dehdasht	Be'sat Gachsaran	All hospi- tals
Active beds	85	23	121	113	142	68	552
Active bed-days	30994	8395	44656	41095	51887	24820	201747
Occupied bed-days	17860	5861	32451	22031	40612	7906	126721
Discharges	4418	462	12382	8115	15195	1798	42370

Table 2: Performance indicators for inpatient wards in individual hospitals, Kohgiluyeh & Boyer-Ahmad Province, Iran, 2006

	Beheshti Yasuj	Raja'ei Yasuj	Emam-Sajjad Yasuj	Raja'ei Gachsaran	Emam-Khomeini Dehdasht	Be'sat Gachsaran	All hospitals
Average length of stay	4.04	12.68	2.62	2.71	2.67	4.39	2.99
Bed occupancy rate	57.6	69.81	72.66	53.6	78.27	31.85	62.78
Bed turnover	52.03	20.08	102.05	71.49	106.81	26.44	76.73

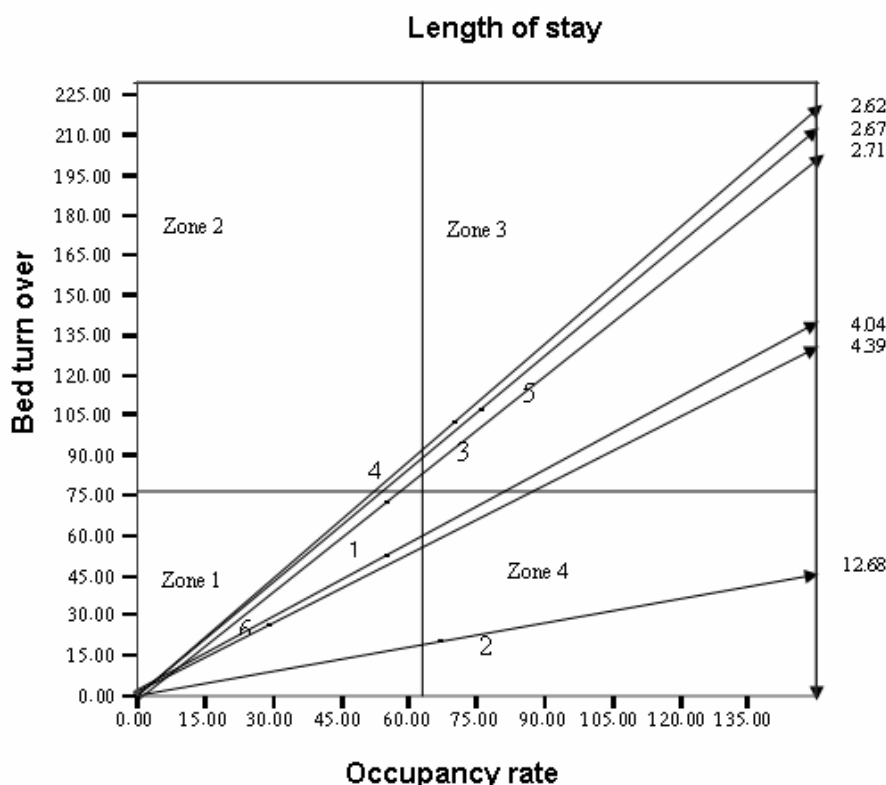


Fig. 1: Pabon Lasso graph showing the performance status of public hospitals in Kohgiluyeh & Boyer-Ahmad Province, Iran, 2006

1-Beheshti Yasuj; 2-Raja'ei Yasuj; 3-Emam-Sajjad Yasuj; 4-Raja'ei Gachsaran; 5-Emam- Khomeini Dehdasht; 6-Be'sat Gachsaran; 7-All hospitals

Discussion

This study used pooled data from six hospitals to derive average performance indices. Reasons for placing all hospitals in a single category included the relatively small number of units under study and the fact that the types of services delivered and the population covered were similar across the hospitals.

There has been little research of this kind in Iran, and previous studies been confined to assessing

only one of the performance indices described above. This makes it difficult to derive valid comparisons between our results and those reported by others. In the absence of an analytical model incorporating all of the three indices, use of single indices could yield misleading conclusions about the overall performance of a hospital. For instance, high BOR can result from either high ALS- indicating efficient performance- or the existence of unnecessary hospitalizations and hence

low efficiency. Use of an analytical model comprising the three indices would be an appropriate way to avoid such confusion. Failure to consider the type and level of services provided is another potential source of error when comparing performance between different hospitals. This is likely to occur when, for example, crude comparisons made between general and specialty/subspecialty hospitals, or between teaching and non-teaching hospitals (15).

A nationwide survey of hospital performance in 2000 showed the ALS in this province (2.9) to be clearly inferior to the average countrywide value of 5.8 d (13). Conversely, BOR and BTO in Kohgiluyeh & Boyer-Ahmad were higher than the average nationwide figures (62.78% versus 49.37% and 76.73 versus 30.6 respectively). As distinct from our study, in which KB hospitals fell in Zone 2 of the Pabon Lasso graph, the nationwide survey in 2000 placed KB hospitals in Zone 3. Such comparisons may not prove very useful, however, as the survey in 2000 comprised all regional hospitals- including public and private, teaching and non-teaching as well as general and specialty centers. The improvement in hospital performance that seems to have occurred between the two studies could in part be due to a change in age distribution and prevalent diseases and, perhaps more importantly, to different data collection and analysis methods. Notwithstanding, the fact that data collection in our study was done on a day-to-day basis and used computer software for storage and analysis makes our results more accurate and reliable compared to those reported from previous studies. It should also be noted that certain hospital sections such as psychiatry and burn units (with high ALS figures and hence a downgrading effect on overall hospital performance), did not exist in many KB hospitals before the year 2000.

The Health and Demographic Survey (DHS) in KB produced a BOR of 42% and an ALS of 2.8 days; these figures are not significantly different from our study (16). In contrast, we found a significantly higher BOR compared to another

study performed by the Health Ministry in 2001. The most likely explanation for these discrepancies relates to differences in data collection and index calculation methods and time.

Two of the hospitals in this study showed a good degree of efficiency by falling into Zone 3 of the Pabon Lasso graph. These institutions can reach an ideal level of performance through appropriate service management and conforming to the current admission and hospital stay standards. The Raja'ei Psychiatric Hospital fell into Zone 4- with high ALS and low BTO- a situation that felt to be due mainly to the nature of the diseases treated at this center. Broad strategies for enhancing the performance of Zone 4 hospitals include a shift towards outpatient services and efforts to overcome shortages and improve management. At any rate, comparison with other psychiatric hospitals is necessary before any remedial interventions planned.

The remaining hospitals fell into Zone 1, indicating poor performance and inefficient use of resources. One short-term strategy to address this problem could include a halt to hospital expansion for the time being. At the same time, every effort should be made to identify and correct factors contributing to the present state of poor efficiency.

Based on the overall performance status in KB, the short-term strategy to improve efficiency in KB's public hospitals must include stopping hospital expansion, as the addition of new beds will only exacerbate the inefficiency.

Our study used a Pabon Lasso model combining the three major indices of hospital performance. These indices show how close a hospital has come to using its maximum performance capacity, and together they provide a basis for reviewing current resource allocation practices and devising strategies for implementation of the required changes. Evaluations based on individual aspects of performance can yield a distorted picture of the overall status of health care in any particular area; it is therefore crucial that the assessment of hospitals comprise all the important dimensions of performance, such as technical ef-

iciency, resource allocation, quality and equity. Regular, periodic evaluations are required to obtain an accurate idea of the overall performance of the hospital system and the real impact of any previous interventions.

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