

Necessity of Admissions in Selected Teaching University Affiliated and Private Hospitals during 2007 in Shiraz, Iran

Nahid Hatam PhD¹, Mehrdad Askarian MD MPH², Yaser Sarikhani MSc¹,
Hale Ghaem MSc³

Abstract:

Background: The use of acute hospital beds is an issue of concern both to policy-makers and practitioners. In most countries attempts are underway to improve efficiency in this sector.

Methods: One of the most widely used instruments for assessing inappropriate hospital use is the Appropriateness Evaluation Protocol, which consists of a set of standards based on objective criteria relating the condition of the patient to the clinical services received. The aim of this study was to measure inappropriateness of admission and inpatient stays at four major hospitals in Shiraz, Iran.

Results: The results showed that 22% of the total admissions in four hospitals were rated as inappropriate. The most as well as the least inappropriate admissions were found in both teaching university affiliated hospitals. Our data has shown that a total of 29.6% (average 6.40%) of the hospital stays in the study population were judged to be inappropriate. The result of the Least Significant Difference Test indicated a significant association between the mean days of inappropriate stay and turn of admission in all hospitals. In the four hospitals, a significant association was observed between the inappropriateness of hospital stay, costs, and length of stay.

Conclusion: Considering the findings of this study, in addition to other studies in Iran and other countries, we can conclude that the factors involving inappropriate admission of patients to hospitals are mostly similar. In order to solve this problem we can use strategies such as: improving the performance of the referral system, using standard criteria for an appropriate evaluation protocol by the medical staff, and extending outpatient diagnostic services to reduce inappropriate hospitalization.

Keywords: Appropriateness evaluation protocol (AEP) - appropriateness of admission - appropriateness of stay

Introduction

Many countries are faced with increasing deficits in the health care sector.¹ Hospital services, as the most expensive component of modern health care systems, are confronted with serious issues and comprise approximately half of the health care expenditures in most developed countries.²⁻⁴ Thus improving the efficiency of hospital care services by cost reduction and using the capacity of existing

healthcare facilities as optimally as possible seems to be necessary. Appropriate stay which is considered to be "up to typical, valuable, efficient, and customized to the patients' actual needs would improve hospital productivity, reduce waiting lists, and satisfy financial constraints without compromising the quality of care."^{1,2}

One of the most widely used instruments for assessing inappropriate hospital use is the Appropriateness Evaluation Protocol (AEP), which consists of a set of standards based on objective criteria relating to the condition of the patient to the clinical services received.⁵ The data of such studies will increase awareness regarding the magnitude and financial burden of inappropriate admissions and hospital stays. The aim of this study was to measure inappropriate admissions in four hospitals of Shiraz, Iran.

Authors' affiliations: ¹School of Management and Information Sciences, ²Department of Community Medicine, ³School of Health and Nutrition, Shiraz University of Medical Sciences (SUMS), Shiraz, Iran.

Corresponding author and reprints: Nahid Hatam PhD, School of Management and Information Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.

Tel:+98-711-229-60-31, Fax: +98-711-228-86-07

E-mail: hatamn@sums.ac.ir

Accepted for publication: 11 November 2009

Patients and Methods

During a six month period from May through October 2007, this prospective study was conducted on 1244 patients admitted to the internal medicine, general surgery, gynecology, and pediatrics wards with 258, 214, 342, and 280 admissions, respectively, in two university teaching hospitals and two private hospitals in Shiraz, Fars Province, Iran. The teaching hospitals (Faghihi and Nemazi) have a total of 458 and 535 hospital beds with occupancy rates of 78% and 80%, respectively, and two private hospitals (Dena and Ordibehesht) with 300 and 250 hospital beds with occupancy rates of 81.8% and 78.62%, respectively; all considered to be the four largest hospitals in southern Iran.

The appropriateness of admissions and hospital days was assessed using the Appropriateness Evaluation Protocol (AEP). The AEP has two sets of criteria: one for admissions and the other for days of stay which have 18 and 27 objective criteria, respectively, which are used to recognize the appropriateness of hospital stays. The criteria for determining the appropriateness of admissions addresses the severity of illness as well as the intensity of services required, which consist of medical and nursing services or life support, and patient condition factors. If any of these criteria are met, then the days of stay or admission are classified as appropriate. The second set of criteria was used for the first ten days of stay, followed by another protocol which was completed for each patient who stayed longer than ten days. Their relation to variables such as turn of admission (first time or readmission), type of insurance, length of stay (less or greater than five days), type of wards and hospitals, inappropriate admissions and the cost for hospital days were assessed.

A systematic sampling method was used to collect data on the basis of one day per week in each hospital. For each hospital, a nurse and physician were involved in data review. Collection and analyses were done using SPSS software version 14.0. Chi-square was used for comparing inappropriate hospital admissions between different hospitals, independent samples *t*-test for the length of stay, and ANOVA to compare the wards and hospitals in relation to health insurance, inappropriate admissions, hospital day cost, and turn of admission. The Least Significant Difference (LSD) test was used as a one-way

ANOVA post-HOC test to compare the means of considered variables in each subgroup, two by two.

Results

From May to October 2007, there were 1244 patients admitted to the four hospitals in the following wards: internal medicine (20%), surgery (17%), gynecology (27%), and pediatrics (22%). A review indicated that 22.85% of the total admissions in the four hospitals were rated as inappropriate. The most and least inappropriate admissions were found in both teaching university affiliated hospitals, Faghihi (31.1%) and Nemazi (14.5%).

Our data showed that a total of 29.6% (average 6.40%) of the hospital stays in the sample were judged to be inappropriate. The shortest and longest stays were observed in Faghihi and Ordibehesht Hospitals as 5.9% and 8.9%, respectively. A comparison of the mean costs of inappropriate stays showed that the smallest and largest values in Faghihi and Nemazi Hospitals (public hospitals) were observed in the surgery, gynecology and pediatrics wards, respectively. While in the private hospitals, most were observed in the gynecology and internal medicine wards (Table 1).

No significant difference was found between inappropriate admission and insurance type; however in all four hospitals, the most inappropriate admissions belonged to social security insurance (23.60%) and the least belonged to care services insurance (12.9%).

In all hospitals studied, the patients with inappropriate admissions had less than five days of stay.

Inappropriate admissions were significantly associated with the type of ward. Most inappropriate admissions in three hospitals (Nemazi, Dena, and Ordibehesht) belonged to the pediatrics wards (18.8%, 25.9%, and 25.5%). No inappropriate admissions were noted in the surgery wards of any of the hospitals.

The results did not show significant differences between the turn of admission and inappropriateness of admissions in two hospitals (Nemazi and Dena). At the same time, the results showed a statistically significant association between the turn of admission and inappropriate admissions in Faghihi Hospital, of which most inappropriate admissions occurred during first time admissions. All inappro-

Table 1. Inappropriate mean of length of stay and their costs according to turn of reception

Hospitals	Turn of reception	Number of patients	In appropriate mean of length of stay	In appropriate mean of stay cost
Nemazi	1	290	0.28	38679
	2	91	0.30	49565
	3	19	0.26	29947
Faghihi	1	248	0.40	55592
	2	38	0.13	16447
	3	11	0	0
Dena	1	257	0.46	476871
	2	58	0.27	293534
	3	17	0.23	266470
Ordibehesht	1	166	0.50	470475
	2	41	0.12	133658
	3	8	0	0

priate admissions also occurred during first time admissions in Ordibehesht Hospital.

The result of the LSD Test showed a significant association between the mean days of inappropriate stay and turn of admission in all hospitals. Based on the findings of this study, no significant statistical difference was observed between the percentage of inappropriate hospitalizations and mean cost of inappropriate days of stay. However in all hospitals, a significant association was observed between inappropriateness of hospital stay, costs and length of

stay.

The reasons for inappropriate days of stay are shown in Figure 1. In all hospitals, the most common reason for inappropriate hospitalization was related to physicians' conservative actions. The results in the internal medicine, gynecology, and pediatrics wards showed that the most common reason for inappropriate hospitalization was related to physicians' conservative actions, while in the general surgery wards the most common reason was related to surgical delays.

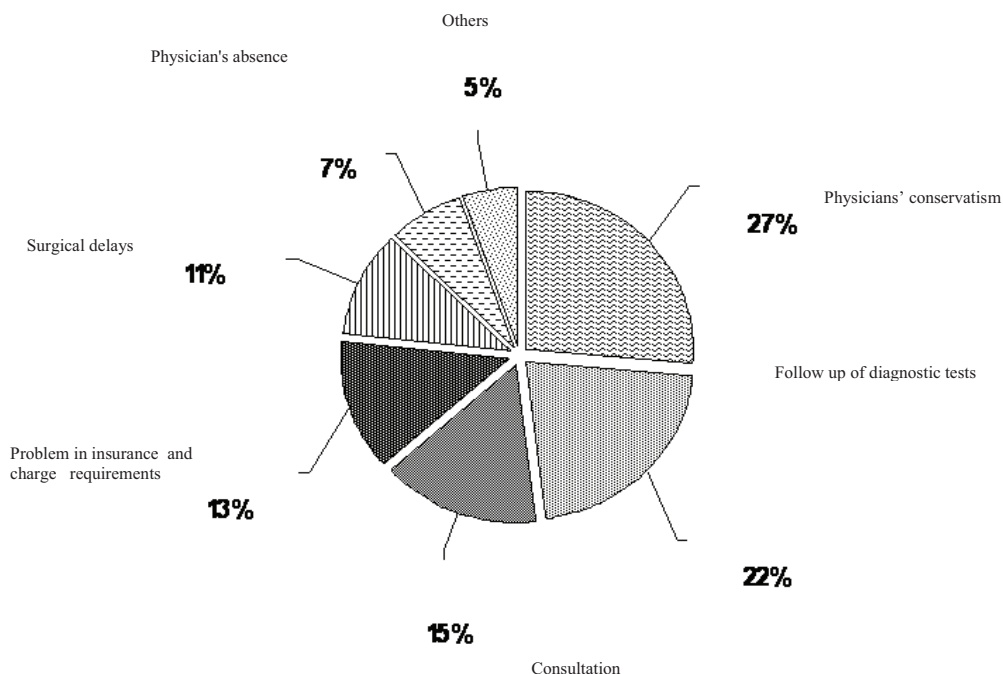


Figure 1. Reason for inappropriate days of stay

A significant association was observed between inappropriateness of hospital stay costs and the length of stay, as well as between the percentage of inappropriate hospital stays and length of stay in all hospitals' wards.

Discussion

Unnecessary patient admissions in hospitals is an issue for which special attention has been paid in developed countries by performing extensive research on this subject.⁶ However, unfortunately the officials of developing countries including Iran, are unaware of the issue or at least have little information about it thus requiring more investigation to study the factors contributing to this problem.⁷

This study showed that the mean percentage of unnecessary admissions in hospitals was 22.85%. Kavousi's study in an educational hospital in Tehran, Iran estimated this indicator to be 29%.⁷ Bianco et al. and Angelillo et al.'s studies in Italy showed that 30% and 14.2% of hospital admissions were unnecessary, respectively.^{5,8} Another study by Chopard et al. determined that 15% of admissions in university hospitals in Geneva were considered as unnecessary.³ Inappropriate admissions in our hospitals may be due to reasons such as:

1) Improper health-care services in lower levels of the Iranian health-care system along with the lack of information about lower-level services among those who should receive them and unreliability of the services provided at those levels were considered the most important factors of unnecessary patient admissions according to Jalali and Hoseini,⁶ and Kavousi.⁷

2) Lack of correct outpatient examinations was the most important factor involved in unnecessary patient admissions at hospitals per McDonough's study.⁴ Also, a lack of communication between physicians at private offices with the medical team in the examination rooms of admitted patients could be another factor.⁹

3) Chopard, in his study, found that the main reason for inappropriate admission is the failure to perform some of the diagnostic tests outside the hospital.³

The findings of this study showed that the mean percent of unnecessary admissions in our hospitals was 6.40%. In most studies conducted abroad, this has been reported differently and, in most cases,

more than the levels reported in Iran.^{2,4,8,10} For example, Bianco et al. in 2003, in a study at a pediatrics hospital estimated unnecessary admissions as 55%,⁵ and in another study in 2006, in a geriatric hospital, he estimated it as 39.50%,¹¹ half of which was due to improper work methods at the hospital and failure to refer patients to other care facilities.^{2,11}

Generally, inappropriate hospitalizations could be attributed to two factors, external and internal. External factors are beyond the hospital control, for example, blocked beds (beds occupied by patients who have no indication for hospitalization) with no non-hospital facility available for their transfer. The study by Chopard showed that over half of the inappropriate hospitalizations were due to external and uncontrollable factors.³

Internal factors can be controlled by hospital management which is usually related to the inefficiency of treatment practices and patients' organization, and mostly due to organizational issues.⁷ The present study showed that approximately 70% of inappropriate hospitalizations occurred as a result of internal factors. Rodríguez-Vera et al.'s study reported failure to follow-up diagnostic test results as the main reason.¹² Antón et al. considered the physician's conservatism as the main factor in his study.¹³ Bianco et al.'s study stressed the effect of the hospitalization section and reporting factors such as the distance from patient's home to the hospital, conducting a larger number of diagnostic tests,^{14,15} physician's conservatism, failure to use outpatient care, organizational issues at the hospital and inefficient planning in hospital cases^{2,5,8} as effective factors.

The findings of the present study showed that hospital costs increase with the time of inappropriate hospitalization. Regarding the imposed costs due to inappropriate hospitalization, it is clear that such a huge cost is a burden on the patient, the hospital and the insurance companies.⁷

Insurance companies and hospitals, particularly public hospitals, profit from better opportunities for organizing their services, thus reducing unnecessary costs. Benefits for patients consist of reduction in their care costs and experiencing less catastrophic health expenditures. However, what is recognized as a defect in the hospital care system is the unawareness of an increase in the numbers of days of patient hospitalization aimed at covering fixed hospital

costs. Solving this problem requires valid clinical evaluations, a qualified accounting system and using an efficient insurance system.⁶ Though lowering inappropriate hospitalization days to zero is impossible; but for achieving an efficient and effective care system, reducing inappropriate days and costs is an obligation. Though some of these factors are beyond the hospital's control; however if standard criteria for admissions are efficiently applied, one can significantly reduce inappropriate hospitalizations. Then, one can treat more patients and the costs and the work burden of the hospital personnel would be adjusted to some degree.^{5,16} Considering the findings of this study, the main measures for unnecessary hospitalizations are as follows:

1) Using standard criteria for an appropriate evaluation protocol by the medical staff (especially in the hospital screening wards), as well as the patient's medical file and appropriate education of the medical staff.¹³

2) Extending outpatient diagnosis services to reduce inappropriate admissions to obtain diagnostic tests results.⁷

3) Appropriate planning of surgical operations to reduce delays in surgical programs.¹

4) Providing a written systematic approach for medical consultations.¹³

5) Providing appropriate, enough out-patient facilities to reduce unnecessary referral of the patients to higher medical centers.⁷

6) Improving the performance of the referral systems in order to reduce referrals to specialized centers.⁶

References

- Gloor JE, Kisson N, Joubert GI. Appropriateness of hospitalization in a Canadian pediatric hospital. *Pediatrics*. 1993; **91**: 70 – 74.
- Panis LJ, Verheggen FW, Pop P. To stay or not to stay. The assessment of appropriate hospital stay: a Dutch report. *Int J Qual Health Care*. 2002; **14**:55 – 67.
- Chopard P, Perneger TV, Gaspoz JM, Lovis C, Gousset D, Rouillard C, et al. Predictors of inappropriate hospital days in a department of internal medicine. *Int J Epidemiol*. 1998; **27**: 513 – 519.
- McDonagh MS, Smith DH, Goddard M. Measuring appropriate use of acute beds. A systematic review of methods and results. *Health Policy*. 2000; **53**: 157 – 184.
- Bianco A, Pileggi C, Trani F, Italo F, Angelillo IF. Appropriateness of admissions and days of stay in pediatric wards of Italy. *Pediatrics*. 2003; **112**: 124 – 128.
- Jalali E, Hoseini M. Assessment of days of patient stay in university affiliated hospitals and comparison to a hospital with insurance contract. Health Economic Conference, Tehran, Iran; 2001.
- Kavousi Z. *Management and Economic Analysis of Admission and Hospitalization by using AEP in University Affiliated Hospitals of Tehran University* [PhD thesis]. Tehran: Tehran University; 2003.
- Angelillo IF, Ricciardi G, Nante N, Boccia A, Bianco A, La Torre G, et al. Appropriateness of hospital utilization in Italy. *Public Health*. 2000; **114**: 9 – 14.
- Luis Zambrana García J, Delgado Fernández M, Cruz Caparrós G, Díez García F, Dolores Martín Escalante M, Salas Coronas J. Factors associated with inappropriate hospitalization at an internal medicine department [in Spanish]. *Med Clin (Barc)*. 2001; **116**: 652 – 654.
- Panis LJ, Gooskens M, Verheggen FW, Pop P, Prins MH. Predictors of inappropriate hospital stay: a clinical case study. *Int J Qual Health Care*. 2003; **15**: 57 – 65.
- Bianco A, Pileggi C, Rizza P, Greco MA, Angelillo IF. An assessment of inappropriate hospital bed utilization by elderly patients in southern Italy. *Ageing Clin Exp Res*. 2006; **18**: 249 – 256.
- Rodríguez-Vera FJ, Marín Fernández Y, Sánchez A, Borrachero C, Puyol de la Llave E. Appropriateness of the admissions and stays in an internal medicine department of a secondary hospital using the current version of the AEP (Appropriateness Evaluation Protocol) [in Spanish]. *An Med Interna*. 2003; **20**: 297 – 300.
- Antón P, Peiró S, Aranaz JM, Calpena R, Compañ A, Leutscher E, et al. Effectiveness of physician-oriented feedback intervention on inappropriate hospital stays. *J Epidemiol Community Health*. 2007; **61**: 128 – 134.
- Bianco A, Foresta MR, Greco MA, Teti V, Angelillo IF. Appropriate and inappropriate use of day-hospital care in Italy. *Public Health*. 2002; **116**: 368 – 373.
- Henshaw DJ, Pollock LM, Rai GS, Gluck TA. Study of admissions and inpatients over the Christmas period using the appropriateness evaluation protocol (AEP). *Arch Gerontol Geriatr*. 2000; **31**: 77 – 83.
- Matorras Galán P, de Pablo Casas M, Otero García L, Alonso López F, Daroca Pérez R, Díaz-Caneja Rodríguez N. Appropriateness of admissions to an internal medicine service at a tertiary hospital [in Spanish]. *Med Clin (Barc)*. 1990; **94**: 290 – 293.