

## Original Article

# Evaluating Inappropriate Patient Stay and Its Reasons based on the Appropriateness Evaluation Protocol

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### ABSTRACT

**Background:** Hospital beds are among valuable resources for care delivery. Therefore, optimum use of them is crucial for increasing the efficiency of health-care services and controlling health-care costs. **Objective:** This study intended to evaluate inappropriate patient stay (IPS) in hospital settings and its reasons based on the appropriateness evaluation protocol. **Methods:** This cross-sectional study was conducted on 335 patients hospitalized in a tertiary care university hospital. Data were gathered prospectively by 13 hospital nurses during a 6-month period. IPS rate was evaluated using a checklist, the 27 criteria of which were related to medical services, nursing/life support services, and patient's conditions. Moreover, a 12-item checklist was used to determine physician-, hospital-, and patient/family-related factors behind inappropriate hospital stay. **Results:** In total, 121 of 1925 (6.3%) hospitalization days of 335 patients were determined to be inappropriate. Neurosurgery and gynecology wards had the highest and the lowest inappropriate hospital stay rates (22.5% vs. 0%), respectively. The main reasons behind inappropriate hospital stay were hospital-related factors (33.1%), physician-related factors (29.1%), and patient-related factors (21.3%). **Conclusion:** A wide variety of physician-, hospital-, and patient/family-related factors contribute to IPS. Given the multifactorial causes of IPS, reducing its rate necessitates multidisciplinary approaches.

**KEYWORDS:** *Appropriateness evaluation protocol, Bed utilization, Health-care costs, Hospital stay, Nurses, Utilization review*

## INTRODUCTION

In many health-care systems, hospital beds are among valuable resources for care delivery.<sup>[1]</sup> Along with increasing demands for hospital bed utilization in recent years due to demographic transitions,<sup>[2]</sup> efforts are needed to reduce the rate of inappropriate patient stay (IPS) in acute care hospital settings.

Utilization review is an effective strategy to assess the appropriateness of hospitalization and the length of stay based on explicit criteria.<sup>[3]</sup> Appropriateness of care is assessed through determining whether services provided to patients are consistent with their clinical needs in terms of diagnosis, signs and symptoms, and medical interventions.<sup>[3]</sup> Such assessments are usually done by utilization review nurses or nurse case managers. Utilization review nurses employ their professional

knowledge and expertise and sometimes appropriateness guidelines or criteria to evaluate the necessity of medical intervention based on patients' physical and mental conditions.<sup>[4]</sup> A study showed that nurse case managers can significantly reduce the unnecessary admissions in various health-care settings.<sup>[5]</sup>

Utilization review guidelines were developed in the 1970s to control health-care costs based on explicit criteria.<sup>[6]</sup> The appropriateness evaluation protocol (AEP) and its adaptations are the most commonly employed tools for the utilization review of hospital beds and

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IPS.<sup>[7]</sup> Studies showed that the length of IPS and its reasons vary widely according to the immediate context.<sup>[6,8]</sup> However, no study has yet evaluated IPS and its reasons in Iran. Thus, the present study was made to narrow this gap.

### Objectives

The aim of this study was to evaluate IPS and its reasons based on the AEP.

### METHODS

This cross-sectional study was conducted between April and December 2013 in a 510-bed tertiary care university hospital located in Kashan, Iran.

With an IPS rate of 8.6%,<sup>[9]</sup> sample size was estimated to be 335 patients. Based on the number of admissions in each ward, patients were proportionately recruited from surgical (142 patients) and medical care wards (193 patients). They were included if they were admitted to the study setting between April and December 2013.

### Data collection

We measured IPS via AEP, which is the most reliable and valid audit tool for determining appropriateness of patient admission and hospital stay in acute care settings.<sup>[6]</sup> It consists of a set of explicit objective criteria in the following two checklists: checklist of criteria for assessing the necessity of hospitalization and checklist of the reasons for IPS on the day of assessment. The first checklist consists of 27 criteria related to medical services, nursing/life support services, and patient's conditions and determines the days of unnecessary hospital stay. A hospitalization day is considered as appropriate if any of the criteria is met. Contrarily, if none of the criteria is met, patient stay is considered as inappropriate and, thus, the second checklist is used to determine the reasons behind IPS. The second checklist consists 12 items in three main categories, namely, physician-, hospital-, and patient/family-related factors. Each of these three main categories is divided into several subcategories.

Given the importance of IPS assessment by health-care providers other than physicians,<sup>[8]</sup> we recruited 13 hospital nurses from the different wards of the study setting to collect the data. Initially, three 1-h training sessions were run for hospital nursing manager and the recruited nurses to explain the study aims, AEP, and how to perform IPS assessment using the AEP checklists. Instead of merely focusing on patient medical records and medical orders, nurses were asked to collect study data through different strategies such as interviewing patients, performing

patient assessment, and taking patient history. Such approach helped verify the appropriateness of patient stay.

### Ethical consideration

This research project was approved by the Research Ethics Board of Kashan University of Medical Sciences, Kashan, Iran (with the approval code of 631). We informed data collector nurses about research objectives, the voluntariness of participation, and the confidential handling of the collected data.

### Data analysis

Descriptive statistics measures were presented for data description. Moreover, the Chi-squared test was used to examine the correlation of IPS with age and hospital ward. Data analysis was performed using SPSS version 13 (SPSS, Inc. Chicago, Illinois, USA). The level of significance was set at below 0.05.

### RESULTS

The total IPS rate was estimated to be 121 days out of 1925 hospitalization days (6.3%). IPS was significantly correlated with patients' age and their hospitalization ward ( $P < 0.001$ ). The highest and the lowest IPS rates were related to neurosurgery and gynecology wards, respectively (22.5% vs. 0%). On the other hand, the most common reasons behind IPS were hospital-related factors (42 days, 33.1%). Further analyses revealed that "awaiting diagnostic procedures," "physician not visiting in a given day," and "patient's inability to afford costs" were the most common reasons for IPS [Table 1].

### DISCUSSION

Our findings indicated that hospital-related factors were the most common reasons behind IPS while the most common hospital-related factor was "awaiting ultrasound/echo, imaging, and laboratory test results." Various studies indicated that length of stay is affected by laboratory, radiology, or any other types of diagnostic studies so much, so that it was determined to be significantly correlated with laboratory turnaround time.<sup>[9-11]</sup> Therefore, reducing laboratory turnaround time and improving the accuracy of diagnostic findings can shorten the length of hospital stay and save hospital budget.

Meidani *et al.* also found that 101 out of 9541 blood samples taken for laboratory studies were useless due to hemolysis.<sup>[11]</sup> In general, there are three types of laboratory errors, namely, preanalytical, analytical, and postanalytical errors. Preanalytical errors happen due to insufficient sample, incorrect sample, or hemolysis, while analytical errors are related to absurd results.

**Table 1: The frequency of the reasons behind inappropriate patient stay**

Main reasons	Reasons	n (%)
Physician related	Delayed surgical operation due to delayed medical order	15 (12.1)
	Physician not visiting in a given day	22 (17)
Total		37 (29.1)
Hospital related	Delayed surgical operation due to hospital-related factors	3 (2.4)
	Awaiting ultrasound/echo, imaging, laboratory test results, etc.	16 (12.5)
	Awaiting consultant visit or report	15 (12)
	Breakdown of hospital equipment	1 (0.8)
	Problem with insurance and reimbursement	1 (0.8)
	Delayed patient referral	6 (4.6)
Total		42 (33.1)
Patient/family related	Discharged but not willing to go home	5 (4)
	Patient's inability to afford costs	20 (15.7)
	Discharged but relatives are absent	2 (1.6)
Total		27 (21.3)
Unknown reasons		21 (16.5)
Total		121 (100)

Moreover, postanalytical errors are related to improper data entry, long turnaround time, and erroneous analysis and reporting.<sup>[11]</sup> Evidence suggests that although nurses play a crucial role in preanalytical errors, they have limited knowledge about them.<sup>[12]</sup> Nurses' failure to obtain and prepare quality blood samples in the preanalytical phase can prolong laboratory turnaround time and hospital stay.<sup>[13]</sup> Moreover, nurses' limited knowledge about the costs of laboratory tests can lead to their overutilization of laboratory services.<sup>[14]</sup> Therefore, enhancing their knowledge and awareness about cost containment and appropriate utilization of health-care resources seems imperative.

Besides enhancing nurses' knowledge, turnaround time can be reduced through automation systems, work process modification, and work redesigning.<sup>[15]</sup> Moreover, in radiology departments, strategies such as picture archiving and communication systems and voice recognition technologies can reduce radiology report turnaround time and thereby shorten the length of hospital stay.<sup>[16]</sup>

Findings of the present study determined the bottlenecks areas of IPS which included test and imaging results cycle and delayed operation. This study not only opened up avenues for more investigation about the utilization review of health-care services but also proposed new

roles and responsibilities for nurses in health-care efficiency and cost containment in Iran.

A limitation of the present study was the use of AEP without any adaptation and modification. AEP questionnaire needs to be validated according to the immediate clinical environment and the structure of the immediate health-care system. Thus, designing culturally appropriate AEP protocols is needed to achieve more reliable and accurate results.

## CONCLUSION

IPS rate in our setting is still high, and bed utilization is ineffective due mainly to hospital-related factors such as delayed diagnostic, consultation, medical, and surgical services. Given the multifactorial causes of IPS, reducing IPS rate and improving bed utilization effectiveness necessitate multidisciplinary approaches. An approach can be the establishment of "utilization review committees" consisting of physicians, nurses, laboratory and radiology technicians, medical education staff, and health-care managers. Developing and using efficient health information systems can also reduce IPS rate and facilitate effective bed utilization. Future studies are recommended to develop and implement strategies to reduce IPS rate and improve bed utilization.

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## Conflicts of interest

There are no conflicts of interest.

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