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Inappropriate hospitalization days in Korean Oriental Medicine hospitals

JEE-IN HWANG[1], JINSUNG KIM[2], WOOCHANG JANG[3] AND JAE-WOO PARK[2]

[1]Department of Nursing Management, College of Nursing Science, Kyung Hee University, Seoul, Korea, [2]Department of Internal Medicine, College of Oriental Medicine, Kyung Hee University, Hoegi-Dong, Dongdaemoon-Gu, Seoul 130-701, Korea, and [3]Department of Oriental Medical Classics, Kyung Hee University, Seoul, Korea

Address reprint requests to: Jae-Woo Park, Third Department of Internal Medicine, College of Oriental Medicine, Kyung Hee University, Hoegi-Dong, Dongdaemoon-Gu, Seoul 130-701, Korea. Tel: +82-2-44-06-219; Fax: +82-2-44-06-295; E-mail: pjw2907@hanmail.net or pjw2907@khu.ac.kr

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Abstract

Objective. To examine the extent of inappropriate hospitalization days in Korean oriental medicine (OM) hospitals and to determine the factors associated with inappropriate stays.

Design. Cross-sectional study design using concurrent and retrospective medical record reviews.

Setting. Two teaching OM hospitals in Korea.

Participants. Patients ($n = 256$) consecutively discharged from general care units in two OM hospitals in 1 month.

Intervention. The appropriateness of each hospitalization day was assessed using a modified appropriateness evaluation protocol. Patient and healthcare use characteristics were also reviewed. Multiple regression analyses were performed to determine factors associated with inappropriate stay.

Main Outcome Measure. Rate of inappropriate hospitalization days.

Results. Overall, 14.9% (691/4644) of hospitalization days reviewed were judged inappropriate with a mean of 18.3% (95% confidence interval = 14.6–22.0) per patient. Approximately half of patients ($n = 126$, 49.2%) had at least 1 inappropriate hospitalization day. Factors associated with inappropriate hospitalization days were admission method and number of types of OM therapies. Patients admitted to hospitals on foot without assistance had more inappropriate hospitalization days than those admitted by stretcher cart. Those who underwent several types of OM therapies during hospitalization had fewer inappropriate hospitalization days.

Conclusions. A substantial proportion of hospitalization days were evaluated as inappropriate. Patient condition at admission and types of OM therapies required should be taken into account to reduce unnecessary stays in OM hospitals. Additionally, availability of OM services, especially for patients with limited motor functions, needs to be improved outside hospitals.

Keywords: appropriateness, Korean oriental medicine, hospitalization day, appropriateness evaluation protocol

Introduction

Concerns about rising healthcare costs have led to increasing interest in the efficient utilization of healthcare services for sustainable healthcare systems internationally. Inappropriate use of healthcare services not only represents inefficient use of limited healthcare resources but also incurs an additional cost burden [1–4]. Hospitals represent the highest proportion of healthcare expenditure [5]. Thus, efforts to reduce inappropriate and unnecessary resource use in acute-care hospitals are essential. However, little data exist on the appropriateness of healthcare service utilization in acute-care oriental medicine (OM) hospitals.

OM in Korea—generally referred to as traditional medicine—has maintained an independent position alongside conventional medicine (CM), and OM has its own distinct established legal and qualifications system. In Korea, there were, in 2009, 158 OM hospitals, including 12 university hospitals; the patients in OM hospitals and clinics comprised 10.7% of the entire healthcare utilization volume in terms of days of visit [6]. With the recent introduction of the government's OM hospital evaluation program, efforts to improve the quality and competitiveness of OM services are now required [7].

Inappropriate hospitalization day (IHD) refers to a patient day in which continuous and active medical, nursing or

paramedical treatment provided by hospital services is not required [8, 9]. Previous studies have reported wide variations in the inappropriateness of hospitalization days. These have ranged from 7.0 to 75.7% internationally [3, 9, 10–21]. In addition, inappropriate hospital stays were associated with various patient and healthcare use characteristics. These patient characteristics included age [1, 4, 9, 14, 17, 19], gender [9], distance from hospital to patient's home [4, 16] and diseases [9, 20]. However, findings are inconsistent. Some studies have found that older patients had more IHDs [1, 9, 17], while other studies reported that younger patients had a higher rate of IHDs [4, 14].

Healthcare use characteristics associated with inappropriate hospital stays include medical specialties [4, 10, 13–15, 18, 19, 21, 22], length of stay [9, 17, 18, 19, 23], admission history [11, 21], admission route [11, 19, 21], admission type [4], day of the week of discharge [23] and bed occupancy rate [4, 9]. For example, medical patients were reported to have a higher number of IHDs than surgical patients [15], while patients with longer hospital stays had more IHDs [9, 17, 23].

Several studies have found that inappropriate or prolonged hospital stays occurred because no caregiver was available; this includes cases where patients lived alone or there was an absence of family support or care facilities [13, 15, 24, 25]. Furthermore, overly cautious and conservative management of patients by hospital administration and physicians has been highlighted as a principal cause of inappropriate stays [10, 13, 15, 23]. In particular, one Korean nationwide report demonstrated that 29% of patients in OM hospitals had stayed for more than 30 days [26]. To date, however, few studies have analyzed the appropriateness of hospitalization days in acute-care OM hospitals. An understanding of the characteristics of OM hospital utilization, which is a significant component of the healthcare system, is necessary not only to promote appropriate healthcare uses but also to improve the efficiency of the overall healthcare system.

Therefore, this study aimed to examine the extent of IHDs and their reasons in OM hospitals. Furthermore, we investigated associated patient and healthcare use characteristics. The study provides baseline data for future evaluation of activities to improve appropriateness of stay in OM hospitals. Our findings could also help healthcare policy makers and hospital executives develop interventional strategies to reduce inappropriate healthcare utilization.

Methods

Design

A cross-sectional study design was employed.

Subjects and setting

The subjects comprised patients consecutively discharged from general care units in two teaching OM hospitals from 1 September to 30 September 2008. Hospital A (228 beds) was the largest Korean OM hospital with 3351 inpatients and 204 248 outpatients in 2008. Hospital B (120 beds) had 1409 inpatients and 82 525 outpatients. Hospital wards included in this study were OM internal medicine, acupuncture and moxibustion, Sasang constitution and OM rehabilitation. The patients admitted to these departments represented 95.8 and 85.7% of total patient admitted in 2008 to Hospitals A and B, respectively. The bed occupancy rate in 2008 was 83.2% for hospital A and 62.4% for Hospital B. Patients aged less than 18 years or who stayed less than 3 days were excluded ($n = 0$). We excluded patients admitted to OM intensive care units ($n = 44$) or transferred to other clinical departments ($n = 1$). Thus, we included 256 patients (170 patients in Hospital A and 86 patients in Hospital B) discharged from the general care units during the study period.

Instrument

A modified appropriateness evaluation protocol (AEP) was employed. AEP is a diagnosis-independent criterion-based instrument consisting of admission criteria and day-of-care criteria. This study only used day-of-care criteria to assess the appropriateness of hospitalization days. It comprises 27 criteria [27]. AEP and its modified versions [13, 28, 29] have been used internationally [1, 2]. This study was based on the Korean version of AEP (K-AEP) that contains 25 criteria for adult days of care and has been used in Korean CM hospitals [20, 21]. K-AEP was modified through research meetings involving three OM doctors for application to the evaluation of the appropriateness of hospitalization days in OM hospitals.

Three OM criteria that reflected appropriate hospitalization days were added to the medical service domain of the K-AEP: (i) at least two acupuncture treatments at different times in the same day; (ii) OM procedures applied before sleeping at night (e.g. sleep-induced cupping treatment); and (iii) four or more types of OM therapies a day, e.g. moxibustion, cupping, transcutaneous electrical nerve stimulation, chiropractic therapy, OM physical therapy and infra-red heat therapy. Thus, the resulting OM-AEP consisted of 28 criteria: 13 criteria for medical services, 7 for nursing/life support services and 8 pertaining to patient condition.

For validity, the OM-AEP-based assessment of 70 randomly sampled patient days carried out by the first author was compared with the results of an OM doctor (a specialist in OM internal medicine) who reviewed hospitalization days as the gold standard on the appropriateness evaluation. The findings were 100% consistent. In addition, inter-rater reliability among the reviewers (the first author and two trained OM doctors) was checked with 60 patient days of 30 patients randomly sampled from the two study hospitals. Pairwise comparisons with Cohen Kappa coefficients were conducted and the Kappa values ranged from 0.88 (very good agreement) to 1.00 (excellent agreement).

Data collection procedure

Medical records were concurrently and retrospectively reviewed for all hospitalization days except admission and

discharge days. The first author and an OM doctor reviewed medical records from Hospital A. A second OM doctor reviewed records from Hospital B. The patient list was obtained from the hospital information system before discharge. The maximum reviewed period for each patient was determined at 62 days. If an OM-AEP criterion was met for the patient day, the day of stay was judged as appropriate. For each IHD, the reasons were examined using six categories: delays related to tests, surgical operations/procedures, medical staff, patient/family, hospital administration, etc. [21]. There were several subcategories in each category. For instance, delays related to patient/family included 'the necessity for daily medical treatments and/or laboratory tests in patients with limited motor function', 'the necessity for daily medical treatments and/or laboratory tests in patients without limited motor function' and 'lack of caregivers at home'. In addition, each IHD could have multiple reasons, which were investigated.

Patient and healthcare use characteristics were also collected. General patient characteristics included gender, age, educational level, residence, marital status and primary caregiver after discharge. The variables related to healthcare use included primary diagnosis, number of additional diagnoses, admission history with the same diagnosis within the past year (yes/no), use of OM and CM ambulatory services within 2 weeks before admission (yes/no), admission route, admission method, clinical department, hospital, type of care (specialist/generalist), length of stay, the number of clinical departments involved in the patient's care, number of types of OM therapies performed during hospitalization, day of the week of discharge, motor function at discharge and discharge status. The number of types of OM therapies refers to the OM therapies performed among nine OM therapies (min = 0, max = 9): acupuncture, electro-acupuncture, aroma acupuncture, direct moxibustion, indirect moxibustion, cupping, chiropractic therapy, transcutaneous electrical nerve stimulation and OM physical therapy. Motor function was coded as 'normal' if the assessment in both extremities was 'full range of motion against gravity and full resistance'. Others were coded as 'abnormal.' Discharge status was categorized as 'recovered', 'relieved', 'diagnosed only', 'death', or 'transfer', based on the formal classification applied by medical record administrators. No patients were classified as 'diagnosed only'.

Data analysis

Data were analyzed using SAS statistical package (version 9.2; SAS Institute, Cary, NC, USA). The IHD rate was defined as inappropriate patient days as a percentage of the total reviewed hospitalization days. Patients' demographics, healthcare use characteristics and IHD rates were summarized using descriptive statistics. Student's *t*-tests and ANOVA tests were conducted to identify differences in IHD rates according to patient and healthcare use characteristics. We performed multiple regression analysis to determine the factors associated with the IHD rate. There was no autocorrelation since the Durbin–Watson statistic was approximately 2.0. *P* value was >0.05 in the White test, which indicated no heteroscedasticity. Furthermore, there was no multi-collinearity among the independent variables as the values of variance inflation factor were lower than 10.

Ethical considerations

Research approval was obtained from the institutional review board of each study hospital (Hospital A: KOMC IRB 2008-05, Hospital B: KHNMC-OH-IRB 2008-008).

Results

General sample characteristics

Table 1 shows general characteristics of the sample. About half ($n = 129$, 50.4%) were female. The mean age was 58.2 ± 16.2 years. Of the sample, 25.4% ($n = 65$) had bachelor or higher degrees and 46.5% ($n = 119$) lived in Seoul where the study hospitals were located. Most ($n = 237$, 92.6%) were married. More than half ($n = 133$, 52.0%) had a spouse as their primary caregiver.

Table 1 General patient characteristics and IHDs

Variable	*n*	%	IHD (%)			*P*
			Mean	95%	CI	
Gender						
Male	127	49.6	18.4	13.1	23.8	0.943
Female	129	50.4	18.2	13.0	23.4	
Age (years)						
≤45	55	21.5	16.0	8.0	24.0	0.330
46–65	105	41.0	16.2	10.5	21.9	
66≤	96	37.5	21.9	15.7	28.1	
Educational level						
College or higher	65	25.4	16.4	8.7	24.1	0.144
High school	73	28.5	20.5	13.4	27.6	
Middle school	85	33.2	14.2	8.7	19.8	
No education	33	12.9	27.7	15.3	40.0	
Residence						
Seoul[a]	119	46.5	20.9	15.4	26.4	0.201
Others	137	53.5	16.1	11.0	21.1	
Marital status						
Married	237	92.6	19.0	15.1	23.0	0.159
Unmarried	19	7.4	9.0	−1.3	19.2	
Primary caregiver						
Spouse	133	52.0	20.6	14.9	26.3	0.045
Family members other than spouse	75	29.3	20.4	13.2	27.7	
Paid caregiver	48	18.8	8.6	5.5	11.7	

[a]Location where the study hospitals are located.

Table 2 Healthcare use characteristics and IHDs

Variable	*n*	%	IHD (%)			*P*
			Mean	95%	CI	
Primary diagnosis						
Stroke	147	57.4	22.9	17.7	28.1	0.014
Facial palsy	48	18.8	10.3	3.8	16.7	
Others	61	23.8	13.5	6.1	20.9	
Admission history						
Yes	51	19.9	13.5	5.4	21.5	0.200
No	205	80.1	19.5	15.3	23.7	
Use of ambulatory services						
In previous 2 weeks						
Conventional medicine						
Yes	27	10.6	4.0	−3.6	11.7	0.001
No	229	89.5	20.0	16.0	24.0	
Oriental medicine						
Yes	56	21.9	17.2	8.7	25.7	0.753
No	200	78.1	18.6	14.5	22.7	
Admission route						
Emergency room	54	21.1	21.5	13.8	29.1	0.036
Outpatient department	174	68.0	19.5	14.7	24.3	
Transfer	28	10.9	4.7	0.0	9.4	
Admission method						
On foot	136	53.1	21.3	15.5	27.2	0.217
With assistance[a]	58	22.7	15.8	9.3	22.3	
By stretcher cart	62	24.2	14.0	8.2	19.7	
Hospital						
A	170	66.4	22.9	18.3	27.5	0.001
B	86	33.6	9.3	3.5	15.1	
Clinical department						
OM Internal Medicine	117	45.7	21.7	15.5	27.9	0.085
Acupuncture and moxibustion	91	35.6	12.7	7.7	17.7	
Others	48	18.8	20.6	12.2	29.0	
Type of care						
Specialist	234	91.4	18.1	14.2	21.9	0.669
Generalist	22	8.6	20.9	5.3	36.6	
Discharge date						
Weekdays	217	84.8	18.8	14.8	22.7	0.547
Weekends	39	15.2	15.6	4.7	26.5	
Motor function at discharge						
Normal	88	34.4	14.5	8.1	20.9	0.139
Abnormal	168	65.6	20.3	15.8	24.9	
Discharge status						
Recovered	139	54.3	15.3	10.6	20.0	0.004
Relieved	86	33.6	26.6	19.5	33.7	
Others	31	12.1	8.7	−0.3	17.8	

[a]It included manual assistance and wheelchair.

Healthcare use characteristics

As shown in Table 2, 57.4% ($n = 147$) had a primary diagnosis of stroke. The mean number of additional diagnoses was 1.0 ± 1.0 (range = 0–4) and 63.7% ($n = 163$) had additional diagnoses. OM internal medicine patients comprised 45.7% ($n = 117$). Most patients ($n = 234$, 91.4%) received specialist care and 19.9% ($n = 51$) had an admission history within the previous year. Of the total patients, 10.6% ($n = 27$) had utilized CM ambulatory care services within 2 weeks before admission and 21.9% ($n = 56$) had received OM outpatient care.

Of the patients, 68.0% ($n = 174$) were admitted via outpatient departments and 53.1% ($n = 136$) came to the hospitals on foot without assistance. The mean length of stay was 19.5 ± 18.3 days and the proportion of patients who stayed longer than 62 days was 4.3% ($n = 11$, range = 63–101 days). Most patients ($n = 248$, 96.9%) received collaborative care by two or more medical departments and the number of medical departments involved averaged 2.0 ± 1.1. The mean number of types of OM therapies performed during hospitalization was 2.8 ± 1.3 per patient. Most patients ($n = 217$, 84.8%) were discharged on weekdays. At discharge, 34.4% ($n = 88$) were assessed as having normal motor function. In total, 54.3% ($n = 139$) of patients had 'recovered' status at discharge, 33.6% ($n = 86$) had 'relieved' status and the remaining included 30 'transfers' to other facilities. One patient died.

Extent of inappropriate hospital stays

In total, 4644 patient days were reviewed, with the mean number of days per patient being 18.1 days (95% CI = 16.0–20.2). The mean IHD rate was 18.3% (95% CI = 14.6–22.0) and 49.2% ($n = 126$) had at least one IHD. In the univariate analyses, significant differences in the number of IHDs were found according to primary caregiver, primary diagnosis, use of CM ambulatory care within 2 weeks before admission, admission route, hospital and discharge status (Tables 1 and 2). IHDs were caused by delays related to patient/family. Specific reasons included the necessity for daily medical treatments in patients with or without limited motor function.

Characteristics associated with inappropriate hospital stays

Pearson correlation analysis among continuous variables indicated that the IHD rate was significantly correlated with the number of clinical departments involved in the patient's care and the number of types of OM therapies undergone (Table 3). Multiple regression analysis was performed for IHD rate. The model explained 27% of variance ($F = 2.76$, $P < 0.001$). Significant factors were admission method and the number of types of OM therapies. Specifically, patients who were admitted to hospital on foot without assistance had a higher IHD rate than those admitted by stretcher cart. Patients who underwent more types of OM therapies had a lower IHD rate (Table 4).

Table 3 Pearson's correlation coefficients among continuous variables

Variable	Mean	SD	1	2	3	4	5
IHD (%)	18.3	30.0	1				
Age (years)	58.3	16.0	0.12	1			
Length of stay (days)	19.5	18.3	−0.11	0.22***	1		
Number of additional diagnoses	1.0	1.0	−0.02	0.33***	0.25***	1	
Number of clinical departments	2.0	1.1	−0.13*	0.14*	0.40***	0.17**	1
Number of types of OM therapies	2.8	1.3	−0.33***	−0.28***	0.07	−0.01	0.08

*$P < 0.05$, **<0.01, ***<0.001.

Discussion

Reducing unnecessary and inappropriate hospitalization is important to improve the efficiency of healthcare systems. This is the first study to explore the appropriateness of hospitalization days in OM hospitals. Our findings demonstrate that approximately half of the patients had at least one IHD. The prevalence of IHDs in OM hospitals was lower than some other reports [10–14, 17–21], but higher than in other studies [3, 9, 15]. This may reflect differences in healthcare systems in various countries and in the methodologies used. In addition, the IHD rate was associated with admission method and the number of types of OM therapies performed during hospitalization. Therefore, these healthcare utilization characteristics should be considered in order to lower IHDs in OM hospitals.

As a factor associated with the IHD rate, the admission method reflects patient condition at admission. Patients admitted on foot without assistance were likely to have less severe conditions than those admitted by stretcher cart. Thus, they may have needed less hospitalization. Although this study did not examine the appropriateness of admission, several studies found that inappropriate admission was related to a higher level of IHD [10, 14, 18]. Therefore, admission procedures should include careful evaluation of whether patient conditions require hospitalization to reduce unnecessary stays in OM hospitals.

The number of types of OM therapies performed during hospitalization was negatively associated with the IHD rate. This can be partly attributed to the OM criteria used for justifying the appropriateness of each hospitalization day. Further, the number of types of OM therapies performed may relate to severity of patient conditions. Patients with complex and severe conditions can need hospitalization, which can contribute to fewer IHDs. This may be because OM therapies were treatment directed rather than for diagnostic or examination purposes.

On the other hand, other variables including age, clinical departments and length of stay were not significant. Although age was not significant factor in this study, several studies have reported that older patients had more IHDs [1, 9, 17]. One possible reason can be that over a third of the patients in our study were older than 65 years. In addition, the previous study found that medical patients had more IHDs than surgical patients [15]. Clinical specialties in OM hospitals seem to have similar characteristics in that invasive procedures such as surgical operations are not performed. This can relate to the result that the clinical department was not significant. Moreover, length of stay was not statistically significant. Additional analysis showed that patients with no IHD stayed for 16.1 days (mean; 95% CI = 13.1–19.1), while those with at least 1 IHD stayed 23.0 days (95% CI = 19.7–26.3). Furthermore, the mean number of appropriate hospitalization days in the present study was 14 days, against 5.8 days in CM hospitals [21]. This finding may reflect the uniqueness of OM hospital service utilization and suggests the need for further study.

This study demonstrated that a substantial proportion of hospitalization days in OM hospitals wase inappropriate. Thus, hospital managers and clinicians in OM hospitals should be involved in promoting efficient and appropriate utilization of healthcare resources. As such, patient condition at admission needs to be carefully assessed in terms of appropriateness of hospitalization. Subsequent periodic monitoring of utilization levels with the application of a valid and reliable explicit tool, such as the OM-AEP validated in this study, will be useful in decreasing unnecessary hospitalization days.

Well-coordinated provision of OM therapies required during hospitalization is necessary to reduce IHDs. Moreover, the main reason for IHDs in our study was the need for daily OM treatments that can be supplied equally well in an outpatient setting. Approximately half of the patients with IHDs had limited motor functions. Therefore, provision of OM services linked to home visits in primary care and long-term care facilities could be helpful for patients with limited functional status who need daily OM treatments. The integrated approaches described above will contribute to the reduction of unnecessary and inappropriate stays in acute-care OM hospitals as well as the improvement of overall efficiency in healthcare resource utilization.

This study had several limitations. First, generalization of the finding is limited because this study was only conducted in two OM hospitals. Second, this study did not review the entire hospitalization period from admission date to discharge date of all the patients within the 2-month maximum. However, the study did review all hospitalization days in 95.7% of the sample. Third, this study did not include the

Table 4 Multiple linear regression result for IHDs

Variable	Coefficient	Standard error	*P*-value
Intercept	0.8	17.9	0.966
Male	−0.5	4.0	0.894
Age (years)	0.1	0.2	0.366
Educational level			
College/university or higher	−1.5	7.5	0.843
High school	−2.9	6.6	0.660
Middle school	−10.0	6.0	0.095
No education	Referent		
Residence (=Seoul)	3.8	3.7	0.306
Others	Referent		
Marital status (=married)	3.6	8.1	0.654
Not married	Referent		
Primary caregiver			
Spouse	−1.5	4.8	0.752
Paid caregiver	−10.8	6.0	0.074
Family members other than spouse	Referent		
Primary diagnosis			
Stroke	8.7	5.4	0.107
Facial palsy	−6.5	6.7	0.334
Others	Referent		
Admission history (=yes)	3.0	5.3	0.568
No	Referent		
Use of ambulatory services in previous 2 weeks			
Conventional medicine (=yes)	−2.9	6.9	0.676
No	Referent		
Oriental medicine (=yes)	4.2	4.7	0.373
No	Referent		
Admission route			
ER	0.5	6.0	0.937
Transfer	−5.6	6.5	0.384
Outpatient department	Referent		
Admission method			
On foot	18.6	7.1	0.010
With assistance	2.1	6.1	0.728
By stretcher cart	Referent		
Hospital A	6.5	6.2	0.295
Hospital B	Referent		
Clinical department			
OM IM	0.1	5.2	0.983
Acupuncture and moxibustion	−4.1	5.9	0.486
Others	Referent		
Type of care (=specialist)	−2.6	6.7	0.695
Generalist	Referent		
Discharge date (=weekend)	−0.8	5.2	0.884
Weekdays	Referent		
Motor function at discharge (=abnormal)	5.3	4.8	0.274
Normal	Referent		
Discharge status			
Recovered	8.6	6.3	0.172
Relieved	13.5	7.6	0.076
Others			
Length of stay (days)	0.0	0.1	0.913
Number of clinical departments involved	0.6	2.1	0.761
Number of additional diagnoses	−1.7	2.1	0.423
Number of types of OM therapies	−5.3	1.6	0.001

$R^2 = 27\%$, adjusted $R^2 = 17\%$, $F = 2.76$ ($P < 0.001$).

variable of bed occupancy rate because it was difficult to collect the data. Several studies have suggested that bed occupancy rate is a significant factor associated with inappropriate or prolonged patient stays [4, 9]. Conversely, although AEP does not assess the clinical necessity of treatments/procedures performed [21], this study provides important information about the applicability of AEP to OM hospital resource utilization. However, OM criteria in the medical service domain of the OM-AEP need to be further studied to fully reflect the variety of OM therapies in different OM hospitals. Moreover, adding three OM criteria to the AEP could lead to underestimating the level of inappropriateness of hospital stays. Therefore, future studies assessing entire hospitalization days in various OM hospitals are recommended.

Conclusions

This study evaluated the prevalence and reasons of IHDs in OM hospitals. A substantial proportion of hospitalization days were judged as inappropriate. Hospital managers and clinicians should, therefore, be involved in improving appropriate uses in OM hospitals. The application of AEP criteria as a generic and explicit tool for assessing the appropriateness of OM service utilization could help to promote more efficient use of hospital resources. The IHD rate was associated with admission method and number of types of OM therapies performed. These utilization characteristics should be considered to promote appropriate use of OM hospital beds. Moreover, as the main reason for inappropriate stay was the need for daily OM treatments for patients with limited motor functions, availability of OM services in home-care settings and long-term care facilities needs to be improved to reduce unnecessary stay in acute-care OM hospitals.

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