

Appropriateness of hospital admissions in general hospitals in Egypt

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ملاءمة الإِدخالات في المستشفيات العامة في مصر

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الخلاصة: قاس الباحثون معدّل الإِدخالات غير الملائمة والعوامل المصاحبة لها في ثلاثة مستشفيات عامة في مصر. وقد راجعوا 1191 إِدخالاً مستخدمين بروتوكول تقييم ملاءمة الإِدخالات للمرضى البالغين والأطفال كلاً على حدة. وقد وجد أن معدل الإِدخال غير الملائم بلغ في اثنين من المستشفيات 66.3% و78.9% في أقسام الجراحة، فيما كان 1.9% في مستشفى ثالث يتبع بروتوكول نوعي للجراحة الانتقائية. وقد كان لقسم الأطفال أخفض مستويات الإِدخالات غير الملائمة في المستشفيات الثلاثة جميعها (0%، 1.0%، 1.9%). وعند إجراء تحليل التحوف اللوجستي كان خط سير الإِدخال هو العامل الوحيد الذي يترافق ترافقاً يعتد به مع الإِدخالات غير الملائمة في أقسام الجراحة والنساء والتوليد والطب الداخلي.

ABSTRACT We measured the rate of inappropriate admissions, and associated factors, in 3 general hospitals in Egypt. A total of 1191 admissions were reviewed using the Appropriateness Evaluation Protocol for adult patients and the Pediatric Appropriateness Evaluation Protocol for paediatric patients. Inappropriate admissions were 66.3% and 78.9% of admissions in the surgery departments of 2 hospitals compared with 1.9% in the 3rd hospital that followed a specific admission protocol for elective surgery. The paediatrics department had the lowest rates of inappropriate admissions in all hospitals (0%, 1.0% and 1.9%). On logistic regression analysis, the route of admission was the only factor significantly associated with inappropriate admissions in the departments of surgery, obstetrics/gynaecology and internal medicine.

Adéquation des admissions dans les hôpitaux généraux en Égypte

RÉSUMÉ Nous avons mesuré le taux d'admissions non pertinentes dans trois hôpitaux généraux en Égypte, ainsi que les facteurs associés. Au total, 1 191 admissions ont été analysées à l'aide du protocole d'évaluation Appropriateness Evaluation Protocol pour les patients adultes et du protocole Pediatric Appropriateness Evaluation Protocol pour les patients pédiatriques. Les admissions non pertinentes représentaient 66,3 % et 78,9 % des admissions dans les services de chirurgie de deux hôpitaux, contre 1,9 % dans le troisième hôpital qui suivait un protocole d'hospitalisation spécial pour la chirurgie réglée. Dans tous les hôpitaux, les services de pédiatrie enregistraient les taux d'admissions non pertinentes les plus faibles (0 %, 1,0 % et 1,9 %). Dans l'analyse de régression logistique, le mode d'admission était le seul facteur significativement associé aux admissions non pertinentes dans les services de chirurgie, de gynécologie-obstétrique et de médecine interne.

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Introduction

Controlling health expenditure is a key element of health care management. With advances in new medical technologies the costs of health care are rising constantly worldwide, and cost containment is major topic of research and applied policies. Utilization review is the backbone of such research and policy-making [1].

One aspect of the utilization review process is assessing the appropriateness of hospitalization, from the appropriateness of admission through to the appropriate length of stay. Besides the unnecessary increase in cost, inappropriate hospitalization leads to an unnecessarily high bed occupancy rate and has been linked to poor quality of care due to hospital overload [2]. Accordingly, applying health care interventions to eliminate unnecessary hospitalization reduces health care expenditure, improves the quality of care for patients and increases the accessibility to care for patients on waiting lists [3]. The Appropriateness Evaluation Protocol (AEP) is the tool most commonly used to assess the appropriateness of admission and days of care in hospitals [4].

The current study aimed to measure the rate of inappropriate admissions to 3 general hospitals in Egypt and the characteristics associated with the inappropriateness.

Methods

Study setting

The study compared the appropriateness of admissions in 3 general government hospitals located in 3 different governorates of Egypt: Cairo, Giza and Alexandria. The hospital in Alexandria had an admission protocol for doing all diagnostic or preoperative investigations for elective operations on an outpatient basis, while the other 2 hospitals had no admission protocol to follow. The 3

selected hospitals were similar regarding the bed capacity: 150–200 beds. Besides patients admitted for free services, general hospitals in Egypt usually accept patients with paid services and with insurance coverage. The medical care delivered is the same but the services are delivered in different departments. All admitted cases in the 3 hospitals were eligible for inclusion in the study.

Sample

The sample size was estimated to be 200 patients per hospital according to a percentage of inappropriate admissions of 15% [5] \pm 5% degree of precision at the 95% confidence interval. The sample size was doubled for each hospital in order to allow a sufficiently large sample for cross-tabulation and for calculating the percentage of inappropriate admissions in different categories. Accordingly, 400 consecutive admissions were concurrently reviewed from each hospital until the sample size was achieved. The study was carried out over the year 2004.

Data collection

A data collection sheet was designed to record information from the patients' records about each case admitted: the patient's personal data, time of admission, day of admission, payment method, reason for admission, laboratory findings at the time of admission, provisional diagnosis and management plan. In each hospital 4 physicians, 1 in each of the main departments (surgery, obstetrics/gynaecology, internal medicine and paediatrics), were trained to fill the data sheet.

Two reviewers independently reviewed the sheets and evaluated the appropriateness of admissions using the AEP [6] and the Pediatric Appropriateness Evaluation Protocol for Paediatric patients (PAEP) [7]. The AEP consists of a set of explicit criteria that indicate the need for acute hospital care

on the basis of the patient's condition and the services delivered to the patient. It has several strengths: it has been extensively tested for reliability and validity and it is generic rather than diagnosis- or procedure-specific. The AEP rates the appropriateness of hospital admission using 17 criteria for the clinical stability of the patient, necessity of medical interventions and planned surgical procedures within 24 hours. An admission is considered appropriate if 1 or more of these criteria are satisfied. The PAEP is a modification of the AEP to be applied in paediatric settings.

Data were analysed using SPSS, version 12. Descriptive analysis was done to calculate proportions and reasons for inappropriate admissions in different departments. All independent factors considered risk factors for inappropriate admissions were adjusted for hospital across the different departments using logistic regression. Adjusted odds ratio (OR) and 95% confidence interval (CI) were computed for each factor.

Results

A total of 1191 admissions were reviewed from the 4 main departments of the studied

hospitals. As shown in Table 1, the rates of inappropriate admissions were highest in the department of surgery in hospital A (in Cairo) and B (in Giza) (78.8% and 66.3% respectively). The department of obstetrics/gynaecology had the next highest with 20.7% inappropriate admissions in hospital A and 58.4% in hospital B. Hospital C (in Alexandria) had an extremely low rate of inappropriate admissions in the departments of surgery and obstetrics/gynaecology (1.9% and 1.0%). The department of internal medicine showed similar rates of inappropriate admissions in the 3 hospitals (17.4%, 17.0% and 21.3%). The department of paediatrics had the lowest inappropriate admissions in the 3 hospitals (0.0%, 1.0% and 1.9%). With such low rates, the department of paediatrics was withdrawn from further analysis.

Diagnostic and preoperative investigations were the main reason for inappropriate admissions in all departments in the 3 hospitals (Table 2).

To determine the factors related to inappropriate admissions, the following factors were adjusted for the significant effect of the hospital using multiple logistic regression: age, sex, social status, education level, day

Table 1 Frequency of inappropriate admissions as a proportion of total admissions by study hospital and department

Department	Hospital A (Cairo)			Hospital B (Giza)			Hospital C (Alexandria)			P-value
	Total	Inappropriate admissions		Total	Inappropriate admissions		Total	Inappropriate admissions		
	No.	No.	%	No.	No.	%	No.	No.	%	
Surgery	157	123	78.8	162	106	66.3	103	2	1.9	< 0.001
Obstetrics & gynaecology	116	24	20.7	77	45	58.4	102	1	1.0	< 0.001
Internal medicine	92	16	17.4	47	8	17.0	89	19	21.3	0.743
Paediatrics	41	0	0.0	102	1	1.0	103	2	1.9	0.609
Total	406	163	40.1	388	160	41.2	397	24	6.0	

Table 2 Reasons for inappropriate admissions as a proportion of inappropriate admissions by study hospital and department

Department/reason for admission	Inappropriate admissions to:					
	Hospital A (Cairo)		Hospital B (Giza)		Hospital C (Alexandria)	
	No.	%	No.	%	No.	%
<i>Surgery</i>						
Diagnostic/preoperative investigation	80	65.0	96	90.6	0	0.0
Awaiting operation	43	35.0	8	7.5	0	0.0
Other	0	0.0	2	3.6	2	100.0
<i>Obstetrics & gynaecology</i>						
Diagnostic/preoperative investigation	20	83.3	43	95.6	0	0.0
Awaiting operation	0	0.0	1	2.2	0	0.0
Other	4	16.7	1	2.2	1	100.0
<i>Internal medicine</i>						
Diagnostic investigation	15	93.8	8	100.0	18	94.8
Other	1	6.3	0	0.0	1	5.3
<i>Paediatrics</i>						
Diagnostic investigation	0	0.0	1	100.0	1	50.0
Other	0	0.0	0	0.0	1	50.0

of admission, route of admission and payment method. For the surgery, obstetrics/gynaecology and internal medicine departments, the route of admission was the only factor significantly associated with inappropriate admissions ($P < 0.05$) (Table 3).

Discussion

The present study assessed the appropriateness of admissions using the AEP in the departments of surgery, obstetrics/gynaecology and internal medicine and using the PAEP in the department of paediatrics. Although the AEP has been modified in some countries to cope with the specific characteristics of each country, it is easily interpreted and has a good reliability and validity, leading to its continued use across different countries [8].

The appropriateness of admission in the paediatrics departments in the 3 study hospitals did not exceed 2% using the PAEP auditing tool, compared with an average 11%–25% in most countries [9]. Formby et al. evaluated the medical records of paediatric patients in Australia and found 24% of admissions were inappropriate [10]. In Canada, Smith et al. examined admissions to acute wards in a tertiary care paediatric facility and found 29% of the admissions unnecessary [11]. This suggests either that there is a lack of standardized case management, with a tendency towards intensive treatments requiring admission even though patients may not be in need of such treatments (e.g. using intravenous rehydration therapy to manage mild/moderate dehydration) or else that the tool itself needs to be modified for Egyptian clinical practice.

Table 3 Factors affecting inappropriate admissions by hospital department, adjusted for hospital using logistic regression

Variable	Inappropriate admissions to:								
	Surgery		Obstetrics & gynaecology		Internal medicine				
	No.	%	OR (95% CI)	No.	%	OR (95% CI)	No.	%	OR (95% CI)
Sex									
Male	128	59.8	—	—	—	—	18	19.6	—
Female	103	50.2	0.82 (0.30–2.10)	—	—	n/a ^a	25	18.4	1.08 (0.50–2.50)
Age group (years)									
> 15–< 60	195	55.1	—	—	—	—	32	20.1	—
≤ 15	26	54.2	5.80 (0.60–56.1)	—	—	n/a ^b	1	33.3	9.40 (0.39–2.29)
≥ 60	10	58.8	9.90 (0.70–142.3)	—	—	—	10	15.2	0.90 (0.34–2.43)
Marital status									
Married	124	57.1	—	64	22.8	—	39	22.8	—
Other	100	52.4	0.38 (0.13–1.09)	4	57.1	0.80 (0.07–8.30)	4	7.3	0.20 (0.05–0.80)
Education level									
Illiterate/read & write	142	63.1	0.74 (0.21–2.60)	37	29.6	0.70 (0.20–2.57)	30	18.9	0.80 (0.35–1.80)
Primary/preparatory	42	42.9	1.05 (0.20–5.60)	22	16.3	1.20 (0.29–5.30)	13	19.1	—
Secondary/university	43	47.8	—	10	30.3	—	—	—	n/a ^c
Day of admission									
Sunday–Wednesday	90	51.4	—	30	20.8	—	14	15.9	—
Saturday	119	58.3	1.28 (0.47–3.4)	25	26.3	0.58 (0.21–1.60)	21	23.9	1.60 (0.67–3.70)
Thursday/Friday	22	55.0	0.73 (0.12–4.1)	15	26.8	1.20 (0.40–3.90)	8	15.4	1.01 (0.35–2.80)
Route of admission									
Emergency room	1	1.2	—	15	8.0	—	5	4.8	—
Outpatient	230	68.9	n/a ^d	55	50.9	26.3 (11.3–60.9)*	36	30.0	4.40 (2.01–9.70)*
Mode of payment									
Free	198	61.3	—	67	30.6	—	41	19.2	—
Paid	32	38.6	0.46 (0.14–1.45)	1	1.4	0.19 (0.01–3.66)	1	8.3	0.49 (0.05–4.60)

*P < 0.05.

^aAll patients female; ^bAll patients adult; ^cNone had higher education; ^dOnly 1 case from the emergency room.

Data were missing for some categories. OR = odds ratio; CI = confidence interval; n/a = not applicable.

This was considered the most important limitation in this study. Unless hospitals use standardized case management for the common diseases in paediatrics, application of the PAEP for admissions review will be limited.

The 3 study hospitals were general hospitals with similar bed capacities, representing the main hospital provision in Egypt. The highest rate for inappropriate admissions was found in the departments of surgery followed by the department of obstetrics/gynaecology, ranging from 20.7% to 78.8% in hospitals A and B. The main reason for inappropriate admissions to these hospitals was undergoing the necessary diagnostic or preoperative investigations in an inpatient rather than an outpatient setting. This explains the very low rate of inappropriate admissions in hospital C, which applies a policy of doing investigations for elective surgery in the outpatient setting. As the policy in the Alexandria hospital was concerned with elective operations, this discrepancy was not observed in the department of internal medicine where the 3 hospitals had comparable rates of inappropriate admissions, ranging from 17.0% to 21.3%, with diagnostic investigations being the main reason for inappropriate hospitalization.

The percentage of inappropriate admissions to the surgery departments in hospitals A and B was higher than that reported in other countries. Teke et al. found inappropriate admissions to be 21% of total admissions in the surgery department of a Turkish hospital [12]. Other studies have reported rates of inappropriate admissions ranging from 16% to 33% [13,14]. In the department of internal medicine, inappropriate admissions in the 3 hospitals were comparable to studies in many countries. In Spain, Luis et al. found inappropriate admissions to the internal medicine department to be 17%

[15] and in another study it was 13% [16]. In Switzerland, inappropriate admissions were reported to be 15% [5].

The main reason for avoidable admissions in the current study was doing diagnostic or preoperative investigations after admission, a finding that agrees with a number of other studies [17–20].

Using logistic regression to adjust for the hospital, admission through the outpatient clinic compared to emergency admission was the sole independent factor related to inappropriate admission in the departments of surgery, obstetrics/gynaecology and internal medicine. The proportion of inappropriate admissions ranged from 1.2% to 8.0% among cases admitted through the emergency room compared with 30.0%–68.9% among patients admitted through outpatient clinics. This implies that system factors within the hospital are the main contributor to inappropriate admissions and that patient-related factors such as age or sex were not associated with inappropriate hospitalization. Accordingly, efforts to review and improve the system of admission, possibly through review and related policies, will greatly affect the utilization of hospital bed capacity.

The route of admission, whether through the emergency room or outpatient clinic, plays a main contributing factor in the analysis of inappropriate admissions. Some studies reported inappropriate admissions among urgent cases to be 23%–28% [21,22]. Other studies showed lower rates of inappropriateness of 4%–5% [23–25]. Although the rate of inappropriate admission among emergencies may vary from one hospital to another and from one country to another, it is the difference between the rate of inappropriate admissions between patients admitted through the emergency room or through the outpatient clinics that has to be identified as the determin-

ing factor in inappropriateness. Navarro et al. mentioned that scheduled admission had an odds ratio of inappropriateness 15 times that of unscheduled admission [26]. A similar result was noted by Angelillo et al., where planned admission was a significant predictor of inappropriate admission [25]. Fernandez et al. in a study on appropriateness of admissions to an ear, nose and throat department reported a percentage of inappropriateness of 6% among patients undergoing elective surgery compared with 0% among non-elective admissions [27].

In view of concerns about the burden of unjustified hospitalizations on health budgets, efforts have focused on interventions to reduce inappropriate admissions and hospital days. This has been approached using pre-set criteria for hospitalization [28], redesigning the processes using quality improvement projects [29] and utilization review programmes [30]. Along with confirmed improvement in usage of hospital beds in these studies, the current study showed that the percentage of appropriate admissions in the Alexandria hospital was high as it applied a protocol that specified

doing necessary investigations in the surgery and obstetrics departments before the admission in an outpatient setting. With the rapid evolution of third-party payers in most countries, including developing countries, it seems imperative to focus on research that supports decisions and proper interventions for better hospital utilization.

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Fifty-sixth Session of the Regional Committee for the Eastern Mediterranean

The Fifty-sixth Session of the Regional Committee for the Eastern Mediterranean is scheduled to take place in Fez, Morocco, from Monday 5 to Thursday 8 October 2009 inclusive. The meeting will be attended by one Representative of each of the Members participating in the Session, accompanied by alternates and advisers. Observers of the United Nations, the United Nations Development Programme, some of the Specialized Agencies, certain other organs of the United Nations, the League of Arab States, the African Union, and a number of other intergovernmental and nongovernmental organizations in official relations with WHO, as well as observers from some national health institutions, will also attend.

Session documents for the meeting are available in English, Arabic and French at: <http://www.emro.who.int/rc56/documents.htm>