Factors influencing inappropriate hospitalization in Riyadh, Saudi Arabia: physicians' perspectives

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العوامل التي تؤثّر على إدخال المرضى دون داع إلى المستشفيات في الرياض بالمملكة العربية السعودية: وجهة نظر الأطباء

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الخلاصة: تستقصي هذه الدراسة العوامل التي تؤدِّي إلى دخول المرضى بدون داع إلى المستشفيات من وجهة نظر الأطباء العاملين في المستشفيات الحكومية، ومستشفيات الرعاية الأولية، والمستشفيات العسكرية في الرياض، بالمملكة العربية السعودية. وقد أظهر الاستبيان الذي استُكمل ذاتياً من قِبَل 250 طبيباً، أن غالبية الأطباء كانوا مدركين لحقيقة إدخال المرضى إلى المستشفيات بدون داع، وكانت المشاكل الناجمة عن الإدخال غير الضروري للمرضى تحدث في المستشفيات العمومية (سواء الحكومية أو العسكرية) أكثر منها في المستشفيات الخاصة. وكانت عدم قدرة أسرة المريض على رعايته، أو الاستجابة لطلب المريض، أو عدم وجود من يمكنه إخراج المريض من المستشفى، من أهم أسباب إدخال المرضى إلى المستشفيات، والبقاء فيها بدون داع.

ABSTRACT This study investigated factors causing inappropriate hospitalization from the physicians' perspectives at government, primary and military hospitals in Riyadh, Saudi Arabia. A self-administered questionnaire to 250 physicians showed that the majority were aware of inappropriate admissions. Problems with inappropriate admissions occurred more frequently at public hospitals (both government and military) than private hospitals. The reasons believed to contribute most to inappropriate admission and hospitalization were the inability of the patient's family to take care of the patient, to satisfy the patient's request, and the absence of someone to get the patient out of the hospital.

Facteurs influençant la non-pertinence des hospitalisations à Riyad (Arabie saoudite) : points de vue des médecins

RÉSUMÉ La présente étude a examiné les facteurs responsables de la non-pertinence des hospitalisations du point de vue des médecins dans les hôpitaux gouvernementaux, primaires et militaires à Riyad (Arabie saoudite). Un auto-questionnaire adressé à 250 médecins a montré que la majorité d'entre eux se rendaient compte de la non-pertinence des admissions. Les problèmes associés aux admissions non pertinentes survenaient plus fréquemment dans les hôpitaux publics (gouvernementaux et militaires) que dans les hôpitaux privés. L'incapacité de la famille du patient à prendre soin du patient, à répondre à sa demande, et l'absence de quelqu'un qui puisse faire sortir le patient de l'hôpital constituaient les raisons considérées comme contribuant le plus à la non-pertinence des admissions et des hospitalisations.

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Introduction

Various studies have looked at the appropriateness of hospitalization. Inappropriate hospital utilization has been described as the "hospitalization of patients who, from the clinical perspective, could be managed on a less intensive health care level" [*1*]. Restuccia et al. defined inappropriate bed utilization as a length of stay of more than 28 days [*2*].

Many factors may lead to inappropriate hospitalization. In a study of appropriateness of admission and average length of stay (ALOS), Bare et al. found that inappropriate admissions were primarily attributable to hospitalization for diagnostic and/or therapeutic services that could have been rendered on an ambulatory basis [*3*]. A survey on inappropriate admissions in inner London found that patients were inappropriately utilizing acute beds because of difficulties in organizing care at home or elsewhere [*4*]. A study on factors associated with inappropriate emergency hospital admissions in the United Kingdom by Coast et al. reported an attempt to assess the factors associated with inappropriate hospitalization [*5*]. They concluded that the complex interplay between the characteristics of patients, referrers and alternate forms of care might result in quite different types of inappropriate admissions in different locations. In a similar study to the present one, Matar conducted a study in Saudi Arabia soliciting physicians' views regarding factors causing inappropriate admissions and inappropriate medical procedures [*6*]. The study found no difference in physicians' views about the appropriateness of admissions in relation to differences in hospital ownership.

Many strategies have been proposed to reduce inappropriate utilization, although not all have been shown to be effective: reducing the average length of stay in hospital [*7*], limiting the number of inpatient care beds and access to outpatient services [*8*], targeting for review only patients with a high average length of stay [*9*] and patient self-referral [*10*]. The key to reducing inappropriate admissions is improving the hospital review process through prospective review (pre-admission of appropriateness and necessity of services before they are delivered) and concurrent review (gathering information about the patient and assessing the continuation of services). However, to be effective, this process needs to be informed about the factors which lead to inappropriate admissions and excessive length of stays in a particular hospital setting.

The rationale for carrying out the present study was the shortage of research about length of stays and inappropriate admissions in Saudi Arabia, and the impending implementation of a national health insurance system in the country, which would require optimum utilization of hospital resources. The aim of the present study was to assess Saudi physicians' beliefs about the extent to which inappropriate admissions and under- or over-utilization of beds occurred in their hospital and the reasons for inappropriate admissions. Comparisons were made between different types of hospital to discover whether inappropriate admissions and bed utilization occurred more frequently at public or private hospitals.

Methods

A descriptive analytical research design was used in this study. A self-administered questionnaire survey was used to examine the factors that influence inappropriate admission and hospitalization in hospitals in Riyadh city, Saudi Arabia.

Sample

A representative sample of all of the hospitals in Riyadh was randomly selected. A stratified random sample technique was applied to cover the 3 categories of hospital care services providers in Riyadh. From Ministry of Health (MOH) government-run hospitals, 6 hospitals out of 10 were selected and coded as A–F to protect anonymity; from private hospitals, 5 hospitals out of 8 were selected and coded as G–K; and from military hospitals, 2 out of 3 were included and coded as L and M. Bed capacities at the hospitals ranged from 120–300 for governmental hospitals, 60–252 for private hospitals and 511–800 for the 2 military hospitals.

The study population consisted of all physicians at all levels, including residents, specialists and consultants at the selected hospitals covered by this study. During the period from December 2001 to March 2002, a stratified random sample was drawn and 400 questionnaires were distributed among the hospitals: 31 questionnaires were distributed among physicians in each hospital, except for hospitals I and K where 25 questionnaires were distributed to each and hospital L where 40 questionnaires were distributed. The difference in the number of questionnaires distributed was due to the different numbers of physicians in each hospital. A total of 250 complete and usable questionnaires were received, an overall response rate of 62.5%. Response rates were 116/180 from MOH hospitals (64.4%), 57/71 from the military hospitals (80.3%) and 77/149 from private hospitals (51.7%).

Instrument

The covering letter attached to each questionnaire explained the purpose of the study and instructions for completing the questionnaire. The first part consisted of 9 questions covering the sociodemographic variables of respondents and 2 questions about hospital name and kind. The second part included a question to reflect the physicians' opinion about inappropriate admissions in the hospital they work in, and another question included 17 statements related to the factors that influence inappropriate hospital admissions. Inappropriateness was described to include both inappropriate admissions (the lack of medical necessity for admission to the hospital) and inappropriate length of stay (the over- or under-utilization of hospital beds). The physicians' opinions about the importance of each one of the above listed factors on inappropriate admission in hospitals were measured on a 4-point Likert scale ranging from strongly agree (1) to strongly disagree (4).

To assure the validity of the research questionnaire, the following procedures were conducted. First, a review was made of the relevant literature and previous study instruments were examined to develop the first draft of the questionnaire. Secondly, a pilot study to test the draft questionnaire was conducted at the King Fahad National Guard Hospital and, based on the responses, some questions were clarified, added or deleted in the study questionnaire. Thirdly, the face validity was assessed by giving the questionnaire to different health professionals, as well as faculty members of the Master's programme in Health and Hospital Administration at King Saud University. Their suggestions were also considered in the formulation of the final draft of the questionnaire.

The alpha coefficient of the questionnaire—an indication of a scale's internal consistency—was 0.82% which is considered a good level of reliability.

Data analysis

Descriptive analyses and inferential analyses were used for the analysis of the data.

Frequencies, percentages, Cramer's V, Kendall's tau-b and Kendall's tau-c methods were used to measure the significance, the strength, and the direction of the relationship between the study variables [*11*].

Results

Physicians' sociodemographic characteristics

Comparisons across the different hospital groups (MOH, private and military) revealed substantial differences in physicians' sociodemographic characteristics (Table 1). For example, military hospitals had the highest proportion of young physicians. For consultant status, private hospitals had more physicians with doctorates than other sectors. However military hospitals had physicians with the longest years of experience, while MOH hospitals had the highest ratio of medical to surgical specialists.

Presence of inappropriate admissions

In Table 2 the data from MOH and military hospitals were combined because they deliver free health services to patients. There was a significant difference between public and private hospitals in the volume of inappropriate admissions and hospitalization. Overall 86.0% of the responding physicians from the public hospitals believed that "sometimes" and "always" there are inappropriate admissions/hospitalization) compared with only 44.0% of those from the private hospitals. The problem of inappropriate admissions/hospitalization occurred more frequently in public hospitals (Cramer's V = 0.447; $P < 0.001$).

Factors causing inappropriate admissions and hospitalization

From Tables 3–5, we can see there were 2 categories of reasons believed to cause inappropriate admissions and hospitalization: patient-related and hospital-related. The patient-related reasons were: inability of the patient's family to take care of him/her; to satisfy the patient's request; refusal of the patient to be discharged on completion of treatment; absence of anyone to take the patient out of hospital; and presence of a relationship between the patient and hospital staff. The hospital-related factors were: lack of a good admissions policy; and delayed test results.

As shown in Table 3, for MOH physicians, there were 3 factors believed to contribute to the problem of inappropriate admission and hospitalization: inability of the patient's family to take care of the patient; to satisfy the patient's request; and absence of anyone to take the patient out of the hospital.

Table 4 illustrates that in military hospitals the major factors believed by physicians to cause inappropriate hospitalization were: inability of the patient's family to take care of him/her; refusal of the patient to be discharged after completion of treatment; to satisfy the patient's request; lack of a good admissions policy; absence of anyone to take the patient out of hospital; presence of a relationship between the patient and hospital staff; and delayed test results.

Table 5 shows that according to physicians in private hospitals inappropriate hospitalization was less of a problem than in MOH and military hospitals. Two reasons for inappropriate hospitalizations were identified, both patient-related; inability of the patient's family to take care of him/her and to satisfy the patient's request.

Physicians' sociodemographic characteristics and reasons for inappropriate admissions

Cramer's V, Kendall's tau-b and Kendall's tau-c were used to measure the significance,

Table 1 **Sociodemographic characteristics of the physicians**

Variable	MOH hospitals (*n* = 116)		Military hospitals (*n* = 57)		Private hospitals (*n* = 77)		Total (*n* = 250)	
	No.	%	No.	%	No.	%	No.	%
Age (years)								
≤ 35	38	34.2	26	46.4	8	11.6	72	30.5
36 ≤ 45	53	47.7	17	30.4	34	49.3	104	44.1
46+	20	18.0	13	23.2	27	39.1	60	25.4
Total	111	100.0	56	100.0	69	100.0	236	100.0
Sex								
Male	93	80.2	41	71.9	67	87.0	201	80.4
Female	23	19.8	16	28.1	10	13.0	49	19.6
Total	116	100.0	57	100.0	77	100.0	250	100.0
Professional title								
Consultant	36	31.3	15	26.3	48	62.3	99	39.8
Specialist	42	36.5	27	47.4	17	22.1	86	34.5
Resident	37	32.2	15	26.3	12	15.6	64	25.7
Total	115	100.0	57	100.0	77	100.0	249	100.0
Specialization								
Surgery	44	38.6	30	52.6	32	42.7	106	43.1
Medicine	70	61.4	27	47.4	43	57.3	140	56.9
Total	114	100.0	57	100.0	75	100.0	246	100.0
Educational level								
Bachelor	43	39.1	16	28.1	10	13.5	69	28.6
Masters	18	16.4	7	12.3	13	17.6	38	15.8
Fellowship	20	18.2	21	36.8	13	17.6	54	22.4
Doctorate	29	26.4	13	22.8	38	51.4	80	33.2
Total	110	100.0	57	100.0	74	100.0	241	100.0
Experience (years)								
≤ 3	51	46.8	17	30.4	44	58.7	112	46.7
4 ≤ 6	27	24.8	13	23.2	21	28.0	61	25.4
7+	31	28.4	26	46.4	10	13.3	67	27.9
Total	109	100.0	56	100.0	75	100.0	240	100.0
Nationality								
Saudi	41	35.7	38	66.7	12	15.8	91	36.7
Non-Saudi	74	64.3	19	33.3	64	84.2	157	63.3
Total	115	100.0	57	100.0	76	100.0	248	100.0

MOH = ministry of health.
n ***= total number of respondents.***

the strength and the direction of the relationship between the physicians' sociodemographic characteristics and reasons for inappropriate admissions (Tables 6 and 7).

Table 6 shows that nationality (Saudi or non-Saudi), sex, specialization (surgery or medicine) and professional title (resident,

Table 2 **Occurrence of inappropriate admissions according to hospital type as reported by physicians**

Response	Physicians in public hospitals[a]		Physicians in private hospitals		Total	
	No.	%	No.	%	No.	%
Inappropriate admissions occur:						
Never	24	14.0	42	56.0	66	26.8
Sometimes	119	69.6	31	41.3	150	61.0
Always	28	16.4	2	2.7	30	12.2
Total	171	100.0	75	100.0	246	100.0
	Cramer's ***V*** = 0.447; ***P*** < 0.001					

[a]Responses from Ministry of Health and military hospitals were combined.

Table 3 **Physicians' views about the reasons for inappropriate admissions at Ministry of Health (MOH) hospitals**

Reason	Total no.	% Required[a]	% Achieved[b]	Importance
Inability of patient's family to take care of patient	115	57.7	66.3	Important
To satisfy patient's request	115	57.7	61.2	Important
Absence of someone to get patient out of hospital	114	57.7	58.6	Important
Refusal of patient to be discharged	115	57.7	56.9	Not important
Delayed test results	114	57.7	52.5	Not important
Relationship between patient and hospital staff	115	57.7	43.1	Not important
Wrong diagnosis	114	57.7	43.1	Not important
Lack of good admissions policy	114	57.7	37.1	Not important
Physicians' inexperience	116	57.4	37.0	Not important
Faulty medical equipment	115	57.7	33.9	Not important
Poor medical records system	115	57.7	31.9	Not important
Admission for teaching purposes	113	57.7	26.7	Not important
Availability of large number of beds	115	57.7	26.7	Not important
To increase the bed usage rate	109	57.9	24.2	Not important
Lengthy discharge procedures	115	57.7	21.5	Not important
Delayed discharge procedures	111	57.8	18.1	Not important
To carry out medical investigations	114	57.7	16.3	Not important

[a]% Required = N/2+ 0.8225√N)N.
[b]% Achieved = % answering "Strongly agree" + "Agree".

Table 4 **Physicians' views about the reasons for inappropriate admissions at military hospitals**

Reason	Total no.	% Required[a]	% Achieved[b]	Importance
Inability of patient's family to take care of patient	57	60.9	89.4	Important
Refusal of patient to be discharged	54	61.3	78.9	Important
Absence of someone to get patient out of hospital	55	61.1	72.5	Important
To satisfy patient's request	55	61.1	73.7	Important
Lack of good admissions policy	53	61.3	73.7	Important
Relationship between patient and hospital staff	55	61.1	63.2	Important
Delayed test results	55	61.1	63.2	Important
Delayed discharge procedures	56	61.1	56.2	Not important
Faulty medical equipment	54	61.3	54.6	Not important
Wrong diagnosis	54	61.3	38.6	Not important
Lengthy discharge procedures	54	61.3	31.6	Not important
Poor medical records system	54	61.3	31.6	Not important
Physicians' inexperience	53	61.3	31.6	Not important
To increase the bed usage rate	50	61.6	26.3	Not important
Admission for teaching purposes	54	61.3	24.5	Not important
Availability of large number of beds	54	61.3	21.0	Not important
To carry out medical investigations	51	61.6	21.1	Not important

[a]% Required = N/2+ 0.8225√N)N.
[b]% Achieved = % answering "Strongly agree" + "Agree".

specialist or consultant) were significant factors.

Saudi physicians tended to believe more than non-Saudi physicians that the following were the causes of the inappropriate admissions: carrying out medical investigations, lack of a good admissions policy, presence of a relationship between the patient and hospital staff, delayed tests results, faulty medical equipment, a poor medical records system, refusal of the patient to be discharged, and inability of the patient's family to take care of the patient (Table 6).

There was a positive relationship between physician's sex and the following factors (i.e. male physicians believed more than female physicians that these factors were the cause of the problem): wrong diagnosis, physician's inexperience, delayed test results, refusal of the patient to be discharged, and inability of the patient's family to take care of the patient (Table 6).

With regard to the specialization of physicians, it was observed that surgeons were significantly more aware of the contribution to inappropriate hospitalization of factors

Table 5 **Physicians' views about the reasons for inappropriate admissions at private hospitals**

Reason	Total no.	% Required[a]	% Achieved[b]	Importance
Inability of patient's family to take care of patient	75	59.5	79.2	Important
To satisfy patient's request	73	59.6	70.1	Important
Refusal of patient to be discharged	74	59.6	46.8	Not important
Absence of someone to get patient out of hospital	71	59.7	46.8	Not important
Delayed test results	74	59.6	27.3	Not important
Wrong diagnosis	72	59.7	24.7	Not important
Lack of good admissions policy	69	59.9	22.1	Not important
To increase the bed usage rate	70	59.9	19.5	Not important
Physicians' inexperience	73	59.6	16.9	Not important
Delayed discharge procedures	74	59.6	13.0	Not important
Availability of large number of beds	73	59.6	10.4	Not important
Lengthy discharge procedures	74	59.6	10.4	Not important
Relationship between patient and hospital staff	73	59.6	10.4	Not important
Admission for teaching purposes	74	59.6	9.1	Not important
Faulty medical equipment	72	59.7	9.1	Not important
Poor medical records system	73	59.6	9.1	Not important
To carry out medical investigations	73	59.6	7.8	Not important

[a]% Required = N/2+ 0.8225√N)N.
[b]% Achieved = % answering "Strongly agree" + "Agree".

such as: availability of a large number of beds, carrying out medical investigations, and faulty medical equipment. A positive relationship also existed between professional titles and the following factors: availability of a large number of beds, lack of a good admissions policy, presence of a relationship between the patient and hospital staff, delayed tests results and faulty medical equipment (Table 6).

Table 7 shows that physician's age, years of experience and educational level were also significant factors.

Age of the physician had a positive relationship with the following reasons for inappropriate hospitalization: carrying out medical investigations, satisfying the patient's request, lack of a good admissions policy, wrong diagnosis, physicians' inexperience, delayed tests results and faulty medical equipment (Table 7).

The physician's years of experience had a significant relationship with only 1 factor: the refusal of the patient to be discharged (Table 7).

Educational level also had a significant positive relationship with the following reasons for inappropriate hospitalization: availability of a large number of beds, lack of a good admissions policy, presence of a

Table 6 **Factors affecting physicians' views of the reasons for inappropriate admissions: analysis of nationality, gender, specialization and professional title**

Factor	Cramer's *V*	*P*-value
Nationality (1 = Saudi, 2 = non-Saudi) and:		
Lack of good admissions policy	0.359	0.000
Refusal of patient to be discharged	0.259	0.001
Delayed test results	0.224	0.007
Faulty medical equipment	0.223	0.008
To carry out medical investigations	0.212	0.014
Poor medical records system	0.213	0.013
Relationship between patient and hospital staff	0.206	0.017
Inability of patient's family to take care of patient	0.182	0.043
Sex (1 = male, 2 = female) and:		
Refusal of patient to be discharged	0.331	0.000
Physicians' inexperience	0.275	0.000
Inability of patient's family to take care of patient	0.235	0.003
Wrong diagnosis	0.230	0.005
Delayed test results	0.230	0.005
Specialization (1 = surgery, 2 = medicine) and:		
Availability of large number of beds	0.199	0.024
To carry out medical investigations	0.187	0.042
Faulty medical equipment	0.182	0.049
Professional title (1 = resident, 2 = specialist, 3 = consultant) and:		
Availability of large number of beds	0.226	0.000
Delayed test results	0.220	0.001
Lack of good admissions policy	0.195	0.007
Faulty medical equipment	0.185	0.012
Relationship between patient and hospital staff	0.170	0.031

relationship between the patient and hospital staff, wrong diagnosis, delayed test results and faulty medical equipment (Table 7).

Discussion

The general aim of this study was to investigate the factors influencing inappropriate admissions at hospitals in Riyadh city. These were investigated from the physicians' perspectives. The sociodemographic characteristics of the respondents were taken into consideration during the analysis.

There was a significant difference in physicians' perspectives according to differences in hospital ownership; that is, pub-

Table 7 **Factors affecting physicians' views of the reasons for inappropriate admissions: analysis of age, years of experience and educational level**

Factor	Kendall's tau[a]	*P*-value
Age (1 = ≤ 35 yrs, 2 = 36 ≤ 45 yrs, 3 = 46+ yrs) and:		
Lack of good admissions policy	0.249	0.000
Delayed tests results	0.209	0.000
Faulty medical equipment	0.201	0.000
To carry out medical investigations	0.197	0.000
Wrong diagnosis	0.132	0.012
Physicians' inexperience	0.118	0.029
To satisfy patient's request	0.101	0.052
Experience (1 = ≤ 3 yrs, 2 = 4 ≤ 6 yrs, 3 = 7+ yrs) and :		
Refusal of patient to be discharged	–0.119	0.034
Educational level (1 = bachelor, 2 = masters, 3 = fellowship, 4 = doctorate) and:		
Lack of good admissions policy	0.193	0.000
Delayed test results	0.162	0.002
Faulty medical equipment	0.154	0.004
Relationship between patient and hospital staff	0.150	0.003
Availability of large number of beds	0.147	0.007
Wrong diagnosis	0.126	0.021

[a]***Kendall's*** tau-***c used for age; Kendall's*** tau-***b used for experience and education level.***

lic hospitals had significantly more cases of inappropriate admissions than private hospitals. This result conflicts with a previous study conducted in Saudi Arabia, which showed no difference in physicians' views about the appropriateness of admissions according to hospital ownership [*6*]. Yet this result could be attributed to the fact that public hospital services are provided free of charge in Saudi Arabia.

The study also showed that the degree of awareness by physicians concerning inappropriate hospitalization varied with the ownership of the hospital. It is clear that the problem of inappropriate admissions/ hospitalization occurred more frequently in public hospitals. Factors identified by physicians were primarily patient-related, and were social and not medical in nature. The top rated factor in all types of hospital was the inability of the patient's family to take care of the patient. Other factors cited as contributing factors to inappropriate hospitalization were the lack of admission policies and the delay in test results.

At MOH hospitals all the factors contributing to inappropriate admission were patient-related issues, not medical but mainly social, and all of which would lead to lengthening of hospital stays.

The first was inability of the patient's family to take care of the patient, the second was to satisfy the patient's request and the third was the absence of someone to take the patient out of hospital. These findings were also established in a study conducted by Victor and Khakoo, where acute beds were inappropriately utilized because of complications in organizing care at home or elsewhere [*4*].

In military hospitals, factors identified by the physicians as contributing to inap-

propriate hospitalization were a mixture of both patient- and hospital-related issues. All of these, however, have the potential of lengthening hospital stays thus causing more inefficiencies and more waste in resources.

At private hospitals only 2 reasons for inappropriate hospitalizations were identified, both patient-related: the inability of the patient's family to take care of him/her and to satisfy the patient's request. In both cases, however, this is usually not a problem for private hospitals since patients have to pay for their care. This difference is further supported by a study by Coast et al., which suggested that alternate forms of care might result in different types of inappropriate admissions in different locations [*5*].

Nationality (Saudi or non-Saudi), sex, specialization (surgery or medicine) and professional title (resident, specialist or consultant) were factors significantly affecting physicians' views about the reasons for inappropriate admissions. Male physicians were more aware than female physicians about factors affecting inappropriate hospitalization. Awareness of inappropriate hospitalization was higher among surgeons than medical specialists, and among residents than consultant physicians.

Age, years of experience and educational level were also significant factors in physicians' views about the reasons for inappropriate admissions. The older the physician, the more importance was given to the following causes of inappropriate hospitalization: lack of good admission policy, delayed tests results, faulty medical equipment, more medical investigations, wrong diagnosis, and satisfying the patient's request. For years of experience, the relationship was negative; that is, the less experienced the physician, the more importance was given to refusal of the patient to be discharged as the cause of inappropriate hospitalization. However, the higher the education level of the physician, the more importance was given to causes such as lack of a good admissions policy, delayed tests results, faulty medical equipment, a relationship between the patient and hospital staff, availability of a large number of beds and wrong diagnosis.

These findings agree with the those of Dermott et al. and Haug et al. [*9,10*]. Both studies indicated that if treatment modalities are applied, and delayed decision-making practices dealt with in time, then average length of stay can be contained. The ability to carry out such procedures is more apparent in the older, more experienced, and more educated physicians.

Conclusions and recommendations

We conclude that more stringent policies and guidelines need to be established at hospitals in Riyadh to tackle the problem of inappropriate admissions and hospitalization. The following recommendations are suggested to improve hospital admission and hospitalization and hence hospital resource utilization:

- Hospital management needs to lay out a policy on admission and communicate technical as well as administrative parameters to assist physicians to make appropriate medical decisions relating to admissions and hospitalization.
- Improved coordination is needed among physicians, admissions department, and other departments inside the hospital such as laboratory department, X-ray department, and so on, to improve the timeliness of patients' tests results.
- Social service departments inside hospital must play a larger and more effective role in discharging patients. This needs

more coordination between patient's family from one side and the hospital staff from other side.

- Finally, further studies in the same subject are recommended to be conducted in other cities in Saudi Arabia to cover most of health care providers, including additional variables that may affect inappropriate admission, in order to gain better utilization of hospital resources.

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