

# National university hospital discharge survey in the Islamic Republic of Iran

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## استقصاء وطني حول تخريج المرضى من المستشفيات الجامعية في جمهورية إيران الإسلامية سيد محمد رضا خاتمي وسيد كامران كامروا وبابك قلعه باغي ومهدي ميرزا زاده

**خلاصة:** أردنا بهذا الاستقصاء تعيين معدل تخريج المرضى من قاعات المستشفيات المختلفة في أنحاء البلاد، ومتوسط طول المكث بالمستشفى ومعدل شغل الأسرة. ولقد شمل الاستقصاء أنشطة خدمات الرعاية الصحية في 452 مستشفى ملحقة بالجامعات في البلاد تحتوي على 59 348 سريراً. ونظراً لغياب بعض البيانات فقد تم تحليل استخدامات 56 315 من هذه الأسرة. ولقد تبين أن معدل تخريج المرضى على مستوى الدولة كان 68.32 مريضاً لكل ألف من السكان في السنة. وكان متوسط طول المكث 3.60 يوماً، كما كان معدل شغل الأسرة 57.44%. ويمكن استعمال هذه البيانات في تصميم إطار للتنبؤ بالاحتياجات المستقبلية من مرافق الرعاية الصحية للمرضى الداخليين.

**ABSTRACT** We aimed to determine the rate of hospital discharge, average length of stay and bed occupancy rate in different hospital wards around the country. The survey consisted of health care service activities from 452 university-related hospitals in the country with a total of 59 348 beds. Because of missing data, the use of 56 315 of these beds was analysed. The countrywide discharge rate was 68.32 patients/1000 population per year with an average length of stay of 3.60 days and a bed occupancy rate of 57.44%. The data could be used to design a framework for prediction of inpatient health care facilities needed in the future.

## Enquête nationale sur les sorties des hôpitaux universitaires en République Islamique d'Iran

**RESUME** Notre objectif était de déterminer le taux de sorties d'hôpital, la durée moyenne du séjour et le taux moyen d'occupation des lits dans différentes salles d'hôpital dans l'ensemble du pays. L'enquête a concerné les activités des services de soins de santé de 452 hôpitaux associés à une université dans le pays avec un total de 59 348 lits. Etant donné qu'il manquait des données, l'utilisation de 56 315 de ces lits a été analysée. Le taux de sorties d'hôpital sur l'ensemble du pays était de 68.32 patients pour 1000 habitants par an, la durée moyenne du séjour s'élevant à 3,60 jours et le taux d'occupation des lits à 57,44%. Ces données pourraient être utilisées pour mettre au point un cadre servant à la prévision des besoins en établissements de soins pour malades hospitalisés à l'avenir.

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## Introduction

In 1994 some reports from the Iranian Organization for Planning and Budget astonished health officials in the country [1]. The reports showed there was an inappropriate geographical distribution of health care services in the country, especially with regard to hospital beds. This had resulted in an overload of patients in some areas and empty beds in others, and a significant loss of health funds due to inefficiency. Since that time, the Ministry of Health and Medical Education has made efforts to solve the problem and prevent similar ones from occurring in the future.

The Ministry of Health and Medical Education appointed the National Committee for Determining Priorities in Health Services to resolve the inefficiency problems. After collecting comments and ideas from health managers in various universities and health organizations, the committee established some criteria for local and national distribution of inpatient health care facilities [2-4]. Data were needed about the rate of discharge, average length of stay and bed occupancy rate (BOR), which were collected from hospitals in different cities, provinces and countrywide. The data were also collected in different areas in some cities. These areas were chosen for similarities in geographical characteristics and regional diseases within which different aspects of health care could be studied and predicted.

The information is important for establishing a framework for prioritizing health services in the country. It can be used to design an efficient plan to improve health conditions in the country and match our desires and ideas more realistically with the present situation [5]. Our survey was an important first step towards concentrating national efforts to become knowledgeable

about the problem and then to manage it rationally.

## Methods

Due to a shortage of time, the study was designed retrospectively as a survey from 21 March 1997 to 21 March 1998 [6]. The study included all of the university-related hospitals in the Islamic Republic of Iran that might have been used for either educational or therapeutic purposes.

We used an existing form (form No. 201-1) that was designed by research branches of the Ministry of Health and Medical Education to collect the data from each hospital [7]. The information, which was completed monthly by the hospital staff, included the following: name of the hospital, the city and province, month and year, and name of the different wards in the hospital. It also included the approved number of beds, number of active beds, bed-days, number of admitted patients, and number of discharges (including deaths) in each ward per month.

After studying the forms, it was decided that they should be gathered from all of the hospitals throughout the country and used in the research. At the time of study, there were 752 hospitals with 81 295 beds in use in the country [8]. We excluded 27% of the beds that were not connected to the universities of medical sciences, because the information about activities in them was not gathered in a comparable format and was not available at the time of our study. Of the remaining 59 348 beds in use, the use of 56 315 (94.89%) was analysed. Information on the other 3033 (5.11%) beds was excluded from analysis because the data were incomplete and unreliable [8]. The data were analysed for each city, province and countrywide [9].

Definitions for some terms used are:

- Rate of discharge: number of patients discharged from each ward in 1 year. This number was calculated per 1000 population.
- Average length of stay: the average number of days patients stayed in each ward and in the hospital. To calculate this parameter, in-bed days in each ward were divided by the output of wards. The output was the sum of the discharged, deceased and transferred patients.
- In-bed days: total number of active beds in each ward, which were occupied by patients, calculated per day, month or year.
- BOR: percentage of beds in each ward occupied by patients during a period of time (day, week, month, year).
- Bed index: number of hospital beds per 1000 population.

## Results

From the 56 315 beds that were studied, 36 619 (65.02%) were in educational and 19 696 (34.98%) were noneducational institutions. The related indices for the data were categorized into 17 specialized wards and the results were calculated for each specialty and sum of them. At the time of the study, the country was divided into 28 separate provinces. The indices for each province and the whole country are presented. For each variable, the mean, minimum, and maximum were calculated.

Table 1 shows the percentage of beds in different specialties, rate of discharge, average length of stay and BOR in the country as a whole. The countrywide rate of discharge was 68.32/1000 population per year among all specialties, with obstetrics and

gynecology having the highest rate (15.85/1000 population). The average length of stay was longest for psychiatry (35.10 days) and shortest for the emergency department (1.23 days). Mean BOR was 57.44% for all specialties, and the highest was for psychiatry (79.00%).

Table 2 gives data on different specialties in the two categories of institution, educational and noneducational. For both educational and noneducational categories, the rate of discharge was highest for obstetrics and gynaecology, 9.11/1000 and 6.74/1000 respectively. Regarding average length of stay, psychiatry had the longest for both educational and noneducational categories at 35.62 days and 22.68 days respectively. In the educational category, BOR was highest for psychiatry (79.59%); for the noneducational category, it was the intensive care unit (68.29%).

Table 3 gives the data by the various provinces. The highest rate of discharge was in Yazd (106.79/1000) and lowest in Sistan va Baluchestan (46.07/1000). The average length of stay was longest in Tehran (5.29 days), and shortest in Bushehr (2.29 days). BOR was highest in Qom (75.08%) and lowest in Bushehr (43.48%).

## Discussion

The results illustrate some important points about the inpatient medical services in the Islamic Republic of Iran. First, it is interesting to consider the rate of discharge. It was 68.32/1000 population per year in university-related hospitals. If we assume that this amount is representative of the entire country and extrapolate it to the whole population, the result is 93.47/1000 population per year. It should be noted that in this crude extrapolation, the figures might be overestimated [5,11]. Comparing the rate of dis-

charge in the Islamic Republic of Iran with other countries [Australia 140, Canada 130, Egypt 30, France 210, Germany 210, Italy 160, Japan 90, Sweden 190, UK 230 and USA 120], we can see that our figure is quite low [12].

Average length of stay was 3.60 days in university hospitals (4.14 days educational and 2.59 days noneducational), which is also relatively low in comparison with other countries (Australia 14, Canada 12, Egypt 8, France 11, Germany 14, Italy 11, Japan 46, Sweden 8, UK 10 and USA 8) [12].

Total bed index in the Islamic Republic of Iran was 1.32/1000 population for all of the beds in use and 0.95/1000 population for university-related beds. Compared with other countries, it can be seen that in the Islamic Republic of Iran there are very few hospital beds per 1000 population (Australia 8.9, Canada 5.4, Egypt 2.1, France 9, Germany 9.7, Italy 6.5, Japan 16.2, Sweden 6.5, UK 4.9 and USA 4.2) [12].

BOR was 57.44%. It is surprising that the few beds per population (bed index) are not occupied appropriately. According to the policy of the Iranian Organization for Planning and Budget and the Ministry of

**Table 1 Percentage of beds, rate of discharge, average length of stay and bed occupancy rate in different specialties in the Islamic Republic of Iran**

Specialty	Percentage of beds	Rate of discharge*	Average length of stay (days)	Bed occupancy rate (%)
Burn	1.57	0.30	10.71	44.87
Cardiology and cardiac care unit	4.29	3.30	4.19	75.99
Dermatology	0.84	0.13	18.50	63.66
Ear, nose and throat	2.20	1.47	3.22	47.58
Emergency	6.45	11.66	1.23	59.47
Intensive care unit	1.40	0.88	4.66	70.37
Internal medicine and infectious diseases	16.51	8.03	5.67	60.81
Neonatology	2.95	2.47	2.66	51.78
Neurology	1.25	0.57	6.44	73.76
Neurosurgery	1.89	0.95	5.89	67.04
Obstetrics and gynaecology	14.08	15.85	1.92	48.74
Ophthalmology	3.18	2.17	3.15	49.67
Orthopaedics	5.21	2.85	5.26	66.68
Paediatrics	11.47	5.47	3.82	43.68
Psychiatry	7.19	0.75	35.10	79.00
Surgery	17.43	10.57	4.03	55.89
Urology	2.06	0.66	5.72	57.26
All specialties	100	68.32	3.60	57.44

\*Per 1000 population/year (in university-related hospitals only)

Health and Medical Education, a bed-occupancy ratio of 70% is the minimum desired to achieve acceptable efficiency in hospitals. A review of the indices in the different provinces showed that the bed index, rate of discharge, average length of stay and BOR varied widely in different cities.

## Conclusion

This is the first time the data on inpatient health care conditions in the Islamic Re-

public of Iran have been studied in such detail. We believe our data can provide a possible framework for predicting inpatient health care services in the future. This information could be used to adjust the type and size of hospitals, the related technology and the human resources in each region with respect to its population, rate of discharge and average length of stay [13]. Also, the data can help locate our critical points of secondary health care in order of priority in order to initiate the appropriate distribution of health care facilities [13].

**Table 2** Bed index, rate of discharges, average length of stay and bed occupancy rate in educational and noneducational institutions

Specialty	Bed index <sup>a</sup>		Rate of discharge <sup>b</sup>		Average length of stay (days)		Bed occupancy rate (%)	
	Ed	NEd	Ed	NEd	Ed	NEd	Ed	Ned
Burn	0.0140	0.0009	0.29	0.01	10.78	9.32	45.82	30.00
Cardiology and cardiac care unit	0.0288	0.0000	2.45	0.86	4.38	3.68	79.41	66.52
Dermatology	0.0076	0.0104	0.13	0.00	18.50	-	63.36	-
Ear, nose and throat	0.0179	0.0042	1.26	0.21	3.26	2.99	50.22	36.25
Emergency	0.0373	0.0158	8.53	3.13	1.32	1.00	64.73	47.05
Intensive care unit	0.0114	0.0006	0.84	0.04	4.67	4.63	70.48	68.29
Internal medicine and infectious diseases	0.1026	0.0602	4.84	3.19	6.81	4.07	67.56	49.29
Neonatology	0.0210	0.0056	1.94	0.53	2.76	2.28	52.98	47.25
Neurology	0.0102	0.0010	0.53	0.05	6.60	4.60	76.37	47.02
Neurosurgery	0.0180	0.0005	0.91	0.04	6.00	3.21	67.57	49.12
Obstetrics and gynaecology	0.0771	0.0634	9.11	6.74	2.10	1.69	54.54	41.68
Ophthalmology	0.0259	0.0038	1.94	0.22	3.24	2.43	51.98	34.13
Orthopaedics	0.0443	0.0065	2.51	0.33	5.38	4.36	68.99	50.98
Paediatrics	0.0526	0.0532	2.92	2.56	4.10	3.50	49.73	37.70
Psychiatry	0.0595	0.0021	0.72	0.03	35.62	22.68	79.59	61.77
Surgery	0.0978	0.0716	5.86	4.72	4.88	3.04	63.09	46.06
Urology	0.0167	0.0023	0.78	0.10	6.03	3.64	59.86	38.51
All specialties	0.64	0.31	45.56	22.75	4.14	2.59	63.31	44.95

<sup>a</sup>Per 1000 population (for university-related hospitals only)

<sup>b</sup>Per 1000 population/year (in university-related hospitals only)

Ed = educational; NEd = noneducational

**Table 3 Population, rate of discharge, bed index, average length of stay and bed occupancy rate in different provinces**

Province	Population <sup>a</sup>	Rate of discharge <sup>b</sup>	Bed index <sup>c</sup>	Average length of stay (days)	Bed occupancy rate (%)
Ardabil	1 192 000	51.57	0.68	2.94	52.75
Azerbaijan (east)	3 268 000	57.41	0.90	3.70	55.37
Azerbaijan (west)	2 549 377	53.71	0.77	3.36	53.25
Bushehr	740 000	75.50	0.91	2.29	43.48
Chahar Mahal va Bakhtiari	778 000	81.82	0.89	2.89	68.75
Fars	4 002 000	56.39	0.81	3.33	49.00
Gilan	2 258 000	75.68	1.15	3.56	57.54
Golestan	1 426 000	49.99	0.54	2.81	50.86
Hamadan	1 715 000	74.58	0.92	3.58	61.68
Hormozgan	1 085 000	68.50	0.75	2.70	57.08
Ilam	494 000	60.92	0.81	2.67	63.74
Isfahan	4 066 000	94.76	0.90	2.80	52.15
Kerman	2 075 000	62.01	1.04	4.36	55.59
Kermanshahan	1 815 000	60.94	0.84	3.19	51.68
Khorasan	6 219 000	73.43	0.91	4.00	65.43
Khuzestan	3 833 000	65.92	0.84	3.56	53.63
Kohkiluyeh va Buyer Ahmadi	557 000	48.30	0.65	2.76	48.33
All Kordestan	1 381 000	67.59	1.00	2.81	47.08
Lorestan	1 672 000	51.55	0.55	2.56	54.87
Markazi	1 259 000	67.05	0.75	2.84	58.72
Mazandaran	2 651 000	77.83	1.08	3.24	53.13
Qazvin	917 000	70.65	0.64	3.15	64.92
Qom	877 000	69.99	0.65	3.59	75.08
Semnan	612 000	90.36	1.43	3.56	56.73
Sistan va Baluchestan	1 757 000	46.07	0.72	3.60	54.44
Teheran	10 629 000	70.86	0.90	5.29	65.88
Yazd	764 000	106.79	1.38	3.87	53.02
Zanjan	911 000	76.68	0.99	2.60	45.82
All the country	61 402 377	68.32	0.95	3.6	57.44

<sup>a</sup>Population during 1997-98 [10]

<sup>b</sup>Per 1000 population/year (in university-related hospitals only)

<sup>c</sup>Per 1000 population (in university-related hospitals only)

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## References

1. Aminloo H et al. *Prediction of needed hospital beds in Iran in years 1998 and 2003*. Teheran, Islamic Republic of Iran, Iranian Organization for Planning and Budget, 1997.
2. Kamrava SK et al. *Booklets of secondary care characteristics in different provinces of Iran consisting of detailed information of health conditions in each province*. Teheran, Islamic Republic of Iran, Planning Council in Curative Affairs, Ministry of Health and Medical Education, 1998.
3. Pilehroodi S. *District health network*. Teheran, Islamic Republic of Iran, Ministry of Health and Medical Education, 1997.
4. *New way to health. Report of the National Iranian Council for Evaluating Health Problems in Iran*. Teheran, Islamic Republic of Iran, Ministry of Health and Medical Education, 1976.
5. Asadi AA et al. *Principles of calculating needed beds in each area*. Teheran, Islamic Republic of Iran, Planning Council in Curative Affairs, Ministry of Health and Medical Education, 1998.
6. Graves EJ, Owings MF. *National hospital discharge survey: 1995 summary*. Hyattsville, Maryland, USA, National Center for Health Statistics, 1997.
7. *Forms of new health information system*, 3rd ed. Teheran, Islamic Republic of Iran, Ministry of Health and Medical Education, 1997.
8. Kamrava SK et al. *Database of Iranian hospitals information*. Teheran, Islamic Republic of Iran. Planning Council in Curative Affairs, Ministry of Health and Medical Education, 1999.
9. Ghalehbaghi B et al. *Database of university-related-hospitals' inpatient activities*. Teheran, Islamic Republic of Iran, Planning Council in Curative Affairs, Ministry of Health and Medical Education, 1998.
10. *National population survey in Iran 1996*. Teheran, Islamic Republic of Iran, Organization for Planning and Budget, Iranian Statistical Centre, 1996.
11. Sweeney TK, Ashley JS. Forecasting hospital bed needs. *British medical journal*, 1981, 283(6286):331-4.
12. *World development indicators 1998*. Washington DC, World Bank, 1998.
13. Khatami SM et al. *Iranian specialized inpatient care: frame of reference*. Teheran, Islamic Republic of Iran, Planning Council of Curative Affairs, Ministry of Health and Medical Education, 1999.