BED UTILIZATION INDICES OF HOSPITALS IN IRAQ

A`mer Mudher Alward¹, Jamal Mahmood Alkhudhairi²

¹Ministry of health (MOH), Salahadin, Iraq.
²Community Medicine Department, College of Medicine, Al-Mustansiriyah University, Baghdad, Iraq.

¹drameralwardi@gmail.com ; ²jamal.khudhairi@gmail.com

ABSTRACT:

Background: Hospitals consume a large proportion of the healthcare budget. Administrators running these hospitals are in an extreme need of objective measures and methods for efficient management of their scarce financial resources. A hospital bed is both a scarce and expensive commodity in healthcare and efficient bed management is known to bring about significant financial benefit to the hospital.

Objectives: the study aims to shed light on Iraqi hospital utilization and performance by using three indicators: average length of stay ALS, bed occupancy rate BOR and bed turnover rate BTOR.

Methods: The study is a cross-sectional hospital-based descriptive analytic study, done inside 28 hospitals covering different Iraqi regions. Data of these hospitals - for the year 2019 - were collected from the health statistics department of each hospital, then analyzed to compare between these hospitals.

Results: The overall number of the active beds, active bed-days, occupied bed-days and the number of admissions were 5960, 2172115, 1203036 and 538262 respectively. ALS: 2.22 days, BOR: 58% and BTOR: 100 times per bed/year.

Conclusions: there is underutilization of hospitals` beds despite the Iraqi hospitals` beds shortage. Iraqi hospitals need to improve their performance and efficiency.

Key wards: hospital, utilization, indices, bed, Iraq.

I. INTRODUCTION:

Iraq Demography: Iraq is one of middle east, eastern Mediterranean region countries with “total population of 39127889, Population growth rate is 2.4, Percentage of urban population is 69.8%, Percentage of rural population is 30.2%, Percentage of population less than 15 years is 40.5% accounting 15833657 child, Child bearing age women (15-49) year is 9552799 female (MOH 2019).

Secondary and tertiary health care: Total number of governmental hospitals and Specialized centers with inpatients beds is 286, Total number private hospitals is 143, Total number of governmental hospitals` beds is 46627, The number of governmental predisposing hospital beds without emergency is 39180, Government hospitals beds` occupancy rate is 56.5%, governmental hospital ratio per 100000 of the population is 0.7 hospital, Ratio of hospital bed/1000 population is 1.2 and Rate of admitted patients/1000 population is 80.9 (MOH 2019).

In developing countries, public hospitals, as the largest operating unit of health systems, expend more than 50% of the whole budget of health care. 80% of these funds are consumed in hospitals whose efficiency is not more than 50% of their ability. This is due to a mixture of issues related to the supply, such as the unnecessary construction of hospitals without prior need-assessment, and poor services quality; it is also caused by demand-related factors such as geographical, financial and cultural barriers to access of people. One of the chief concerns of health system managers and policy-maker in these countries is to improve the hospitals` efficiency and performance (Bahadori M. et al 2011).
Use of efficiency indicators in hospitals to compare their relative performance to ensure the best use of resources is rarely emphasized. Given that hospital, as an important health care providing institution, has a special importance in returning physical and mental health to patients, training health sector specialists, medical research, and ultimately, promoting community health, it uses up a major proportion of health system resources. For optimal use of its existing resources, inevitably it has to use economic analysis and performance evaluation indicators. The most important indicators used in hospital performance evaluation are: Average Length of Stay (ALS), Bed Occupancy Rate (BOR) and Bed Turnover rate (BTOR) (Imamgoli S. 2014).

1 **Average length of stay**: The length of spent time by patients in hospitals for particular situations has a huge influence on whole costs of health system. Though prolonged hospitals’ stays may be caused by causes exterior a control of hospitals, there are significant chances to upsurge efficiency by decreasing elongated hospitals’ stays, providing that patients are not put at danger by being referred house too quickly. Evidences about ALS amongst patients offer some awareness into the hospitals’ efficiency and resident health system as in the next approaches:

- From a viewpoint of hospitals, short ALS is more efficient, making beds vacant more rapidly for provision of healthcare for more number of patients, in addition to diminishing the charge per patient. Though, too short stays may decrease the quality of healthcare and consequence in worse patients’ outcomes.

- Long ALS stays are frequently because of complications and can be accompanying with a greater hazard of adverse events. Long ALS may moreover be caused by reasons not related to the patients’ clinical complaint, for example delaying in consultation or coordination healthcare with other health professionals who have a task in supporting recovery of patients. It is frequently more appropriate to assess identical set of hospitals having a similar case-mix (NHPA 2013).

1 **Bed occupancy rate**: BOR is a measure of utilization of the existing capacity of hospital’s bed. It reveals efficiency in the usage of hospital beds. Then hospital can be understood to be efficiently operating at BOR of 80 to 90 percent (Barnum H. et al 1993).

2 **Bed turnover rate**: BTOR measures hospital beds productivity, and it represents “the number of patients treated per bed in a defined period, usually 1 year”. BTOR of chronic care hospitals for example orthopedic or teaching or referral hospitals are predictable to be lower than those of acute care hospitals.

II. METHODS

This study is a cross-sectional hospital-based descriptive study, done inside 28 hospitals selected from six governorates covering different Iraqi regions, excluding Kurdistan three governorates because they follow their own regional ministry of health with somewhat different health system. The six governorates were selected by non-random adjusted sampling (judgment and convenience) 2 from every Iraqi stratum: north, middle and south. Baghdad, Nieneva and Basra were selected judgmentally because they are the largest Iraqi governorates. In addition, Kirkuk, Wasit, & Missan were selected conveniently.

Hospitals: There are 201 different governmental hospitals and tertiary centers having beds all over Iraq, except Kurdistan region (MOH 2019). Four governmental hospitals of different types, were randomly selected from each governorate: general, specialized, teaching and district hospitals, making a total of 28 hospitals (except Baghdad, 8 hospitals were selected). Military hospitals were excluded due to data access restrictions. Private hospitals were also excluded due to its different utilization system.

Data include: number of available beds, the actual number of active beds ready for use, number of active bed-days, number of occupied bed-days, number of admissions, and performance data include: BOR, BTOR and ALS. Data of these hospitals - for the year 2019 - were collected from the health statistics department of each hospital, and then analyzed using SPSS for windows software (version 24).

**Definition of Variables**: (EasyCalculation 2020)

1 **Active bed-days**: active beds ready for use multiplied by 365 (number of yearly days).
Occupied bed-days: is a simple summation of all admission days for all admitted patients (= ALS x inpatients).

Average length of stay (ALS) refers to the average number of days that patients stay in hospital. It is measured by dividing the total number of days spent by all inpatients during a year by the number of total admissions.

ALS=\frac{\text{Total inpatient days}}{\text{Total Admissions}}

Bed occupancy rate (BOR): Occupancy rate is the ratio of used space to the total amount of available space to declare the actual consumption of an inpatient health capacity for a given time period.

\text{BOR} = \frac{\text{Total inpatient days (occupied bed-days) for a given period \times 100}}{\text{Available beds \times Number of days in the same period.}}

Bed turnover Rate (BTOR) is a measure of the extend of hospital utilization, it is the number of times there is change of occupant for a bed during a given time period.

\text{BTOR} = \frac{\text{Number of admissions in a given time period}}{\text{Number of active beds during the same time period.}}

### III. RESULTS

Table:1 shows that all 28 studied hospitals are governmental, Only (9) of them (32\%) are specialized, and the rest are general. There are 7 district hospitals, all of them are general. Fifteen hospitals (53\%) are teaching. The overall number of the active beds, active bed-days, occupied bed-days and the number of admissions were 5960, 2172115, 1203036 and 538262 respectively. ALS: 2.22 days, BOR: 58\% and BTOR: 100 times per bed/year.

### IV. DISCUSSION

1. **Average length of stay**: The current study found that the mean of ALS for 28 hospitals studied during 2019 is 2.22 days. This number is lower than that recorded in many countries: Jordanian study found that the mean ALS of 15 hospitals was found to equal to 2.9 days (Ajlouni et al. 2013). Turkey Ministry of Health hospitals in general, according to data of 2017, It was determined as 4.5 days (Yiğit A. 2019).

Studies on hospitals belong to medical school in Iran showed mean ALS of 4.1 days (Kalhor R. et al 2014), 3.21 days (Goudarzi R. et al 2014), while the standard favorable value of Iranian Ministry of Health and Medical Education is less than 3.5 days (Khallilabad TH, et al. 2020).

During 2017, amongst the EU Member States, the ALS fluctuated from 4.5 days in the Netherlands, 5.3 days in Bulgaria and 5.5 days in Denmark to 9.1 days in France, and 9.8 days in Hungary (Eurostat 2020). A study in Nigeria found that the least mean ALS was 3.27 days (Henry E. et al 2020).

Hospitals with smaller ALS than their peers can be considered to be performing relatively well than those with higher ALS. According to the current study the shortest ALS was observed for Al Madayen general hospital, Daquq general hospital and Abu Greb general hospital. This can be explained that these hospitals are more efficient than the others in relationships of effectiveness in treatment for their patients and in terms of short ALS. Other cause may be that these hospitals tend to treat more number of acute cases than others, but the logical explanation is that, all those three hospitals are district hospitals and they may refer many cases that may need longer period of stay to larger and specialized hospitals in governorate’s center.

The study found that there are 3 hospitals have relatively long ALS of more than 3 days: Al Sadr general teaching in Basrah, Central teaching for pediatrics and Al Karkh general hospital. This can explained that for the first two hospitals, they are known to treat mostly referred and frequently chronically sick patients. Other possibility is managerial inefficiency in those general/teaching hospitals resulting in delay of diagnosis and management.

In general, the low ALS in the current study can be attributed to

- Hospitals’ policies to reduce ALS to conserve and retain resources.
• Desire of hospitals’ staff to reduce ALS to minimize any problems that may occur with admitted patients

• Despite the governmental Iraqi hospitals provide semi free health services, there are invisible spent charges like under table fees making patients quit hospitals earlier.

• The wish of Iraqi patients to go home as early as possible because of the cumulative community culture that they may get worst or getting hospital acquired infections. Many of them end their hospital’s admission on their responsibility.

Population growing and aging can disturb the demand for hospital’s healthcare. Old people are naturally the highest consumers of hospitals’ healthcare, leading to rising admission rates and ALS (Ravaghi, H. et al 2020).

To achieve a “decline in ALS:

1) Decrease admissions by providing primary care doctors with clear guidelines

2) Effective referral system

3) Efficient consultation clinics providing supervision by senior clinicians before admission

4) Early discharge and providing suitable care at home by qualified health personnel with appropriate discharge planning, which would comprise communication with hospital and community staff.

5) Upsurge day surgeries and investigations for elective procedures instead of needing longer admissions.

6) Reduce long waiting times for prescriptions, discharge letters and related health professionals’ appointments.

7) Consistent reviews by hospital management to guarantee the above” (Nerminathan V. et al 2014).

1 Bed occupancy rate: Among the 28 hospitals in the current study the maximum BOR was observed for Al Elwiyia teaching for pediatrics and Al Salam general teaching. While the minimum number was seen in Al Karkh general hospital and Al Karamah general teaching.

The mean BOR for the hospitals studied was 58 percent which is very close to the number found for mean of all governmental hospitals of Iraq in the same year which is 56.5% (MOH 2019). Other years Iraqi numbers are 52.6% in 2016 (MOH 2016), 49% in 2017 (MOH 2017), 54.4% in 2020 (MOH 2020).

Younsi (2014) in a comparative assessment got a value of 58.1 percent as mean BOR for 40 public hospitals in Tunisia (Younsi M. et al 2014). In Uganda, a study over a period of 10 years shows that the average BOR was as much as 78.8% (Accorsi S. et al 2003). A more recent evaluation in Uganda, Sub-Saharan African country, showed average BOR of 49.35% (NabuKeera M. et al 2015). In Nigeria, a study for teaching hospitals, between year 2010 and 2016 (7 years period), the mean BOR was 42.14% (Henry E. et al 2020). Iranian national BOR average is 57.8% (Ghobad M. et al 2017), while the standard favorable value of the Iranian Ministry of Health and Medical Education is more than 70% (Khalilabad TH, et al. 2020).

The mean BOR gained from the current study is similar to the BOR of 56–61% amongst public hospitals in Malaysia between 2006 and 2010 (Nwagbara VC. et al 2015). In current years BOR in countries for example Indonesia range between 55 and 60 percent in both public and private hospitals, as matched to 80 percent average for hospitals of South-East Asian region (Awofeso N. et al 2013).

The conventionally recommended standard for BOR of hospitals is 85% (Accorsi S. et al 2003), suggesting that the mean BOR of 58% in the current study is comparatively low. Hence, hospitals in present study could be said to be regarded as inefficient in ‘hospitals’ beds utilization throughout the year 2019.

The following factors can be mainly attributing to low BOR:
a) unwell operative healthcare system that is being abandoned by people because of low equity, sub-optimum awareness to expectations of the community, low efficient health workforce and healthcare quality is lower than expected level;

b) demographic and epidemiological alterations, with fewer requirement for acute care beds, and larger chances for patients to self-manage chronic diseases;

c) medical tourism, throughout which many thousands of Iraqis search for treatment overseas;

d) financing mechanisms of hospital care which allocates grander weightiness to beds number instead of efficiency of inpatient healthcare providing, in addition to machine-like health planning approaches that don’t take into account the strengths, weaknesses, opportunities and threats of Iraqi’s healthcare system;

e) private hospitals and outpatient services have greater responsiveness to community expectations;

f) Patronage of traditional and alternative medicine;

g) improper security condition and expectation of presence of infectious diseases, make patients to delay their treatment appointments or seeking other health facilities.

1 Bed turnover rate: The highest expected value of BTOR is 365 which is the days of a year, means that bed is used daily by a new patient. The BTOR of the studied hospitals were between 25 and 182 and the mean of 100 patients per/ bed per year, which is regarded as high compared to Jordanian hospitals that have 83 patients per bed per year (Ajlouni et al. 2013). Turkey Ministry of Health hospitals in general, according to data of 2017, it was determined as BTOR of 56.2 patients/ bed per year (Yiğit A. 2019). Iranian hospitals that are joined to medical school have BTOR between 61 and 96 patients/bed per year (Gholipour K, et al 2013). And again higher than that of a study in Nigeria, the BTOR of the teaching hospitals were between 7 and 34 patients/ bed per year, with a mean of 21.27 patients/bed per year (Henry E. et al 2020).

This can be explained that the very high BTOR for the Gynecology wards in all 28 hospitals (except the wards of Al- Sadr General teaching/Misan = 87), reaching more than highest logical expected limit (which is 365) to reach 420 patients/ bed per year in Kirkuk general hospital. This will shift the overall mean for all hospitals to be as high as 100 patients per bed per year.

It is concluded that there is underutilization of hospitals’ beds despite the Iraqi hospitals’ beds shortage and Iraqi hospitals need to improve their performance and efficiency by good hospital management, follow hospital admission policies and standard with upgrading of health services to reach that of EMRO and world. This study has been able to identify existing and future problems as well as some likely solutions. The study has also demonstrated the immense utility of bed utilization indices as objective tools which should be routinely used by hospital administrators not only for effective and efficient running of the hospital but also for future planning.

REFERENCES:


Table 1: Bed utilization variables & efficiency indicators in studied hospitals.

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