Hospital Accreditation: What is its Effect on Quality and Safety Indicators? Experience of an Iranian Teaching Hospital

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Background: program evaluation is an integral and expected component in the development of any healthcare program. It helps decision-makers to base their decisions on facts. **Objective:** This paper analyzes the effect of accreditation on three indicators related to patient safety and hospital care quality in ICU wards of an Iranian teaching hospital. **Methods:** This interventional study was accomplished based on executive management and scientific methods such as plan-do-check-act (PDCA) cycle and audit to improve quality and safety. We used data reported from ICU wards of the hospital to analyze the effect of accreditation on the three selected indicators. (SPSS) version 22.00 was used for the statistical analysis. **Results:** In total, 6997 patients were analyzed. The accreditation interventions appeared to be effective at reducing pressure ulcer incidence average (from an average of 6.8 percent to 4.1 percent) ($p=0.045$). The accreditation also. The average stays of the patients during the study also positively changed from an average of 1.58 days to 10.13 days (1.45 improvements) ($p=0.0303$). In relation to hospital acquired infection but, unexpectedly, its effect on hospital was negative, then it considerably increased and rose from 1.5 percent to 8.1 percent ($p=0.001$). However, this increasing was due to enhanced infection incident report system. **Conclusion:** hospital accreditation has presented ample opportunity a significant positive effect on hospitals.

Keywords: Hospital accreditation, health care quality, length of stay, bed sore, nosocomial infection.

INTRODUCTION

Assuring quality of healthcare services is one of the most prevalent topics of discussions in health systems globally.[1-5] As part of their responsibilities in this field, health systems authorities and decision makers are implementing a large range of methods and tools to evaluate and promote quality of health services.[6,7]

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Hospital accreditation (HA) system is one of the most modern and preferred methods for assessing and also improving quality of health services. It is usually defined as a voluntary program, funded by an independent agency, in which a team of experienced and qualified peers periodically assess the health service organizations' compliance with the pre-established and clearly defined standards.[8-10] This multidisciplinary Surveyor team activity include onsite surveys, interviews, document analysis, and key clinical and organizational data appraisal.[11]

Even though the accreditation program itself does an evaluation of health care organizations, the program evaluation is also necessary for avoiding going beyond its stated goals.[1]

A compulsory hospital accreditation program was introduced in Iran in 2013 with the aim of stimulating quality improvement in hospital settings, in which it is governed by the Ministry of Health and Medical Education (MOHME).[12] The program's importance is obvious because of its

extent implementation in the country through Iran's 40 universities of medical sciences. Then it is necessary to evaluate its effect in terms of some objective and patient outcome-based indicators. Despite this sheer necessity, little is known on its effects on quality of care and patient safety indicators.

This paper attempts to assess the effect of the accreditation program on three selected indicators related to the safety and quality of hospital care in a medical research and training hospital in Tabriz, Iran.

MATERIAL AND METHOD
Study Design and Sample Collection

This study was conducted in an educational, medical and research center in Tabriz, Iran in order to assess the effect of accreditation on three indicators related to safety and hospital care quality. Researchers used the executive management interventional approach and scientific methods of quality improvement, such as PDCA and control cycle for quality improvement and safety of services provided.

This general subspecialty hospital with 800 beds is considered the largest (in terms of number of beds) and the best equipped referral hospital in Northwest Iran. The target population of this study included all patients from the beginning of 2013 to the end of the second half of 2015 in five ICUs (surgical, pulmonary, neurology, neurosurgery and general) of the hospital. The total number of patients in this interval was 6997 people.

Data collection

At the beginning of the study, all special sections of the hospital were evaluated and the status was determined (internal accreditation) based on National accreditation standards, measures and the evaluation guidelines and training packages in the Ministry accreditation program. The evaluation was performed by a researcher who is a member of the executive management team and is responsible for the hospital quality improvement unit with the participation of process owners, including heads of departments and three interested and trained experts in clinical and para-clinical issues from the quality improvement unit.

The problems were identified based on the results of internal accreditation. Requirement and recommended interventions were designed by the researchers and approved in the relevant committees. These interventions were done in the form of different programs, including education, policy formulation, revision of clinical and care management processes, providing equipment and facilities for modification of physical space and other requirements related to the accreditation program in the form of scientific management techniques such as PDCA, RCA and FMEA to establish accreditation measurement and standard.

Measures

In this study, several indicators related to quality improvement and patient safety were selected and monitored to determine the effectiveness of interventions in terms of accreditation, in addition to the achieved scores in the local and national accreditation criterion as follows:

Shelf life indicator is required for special care to maintain and improve patient safety, prevent hospital acquired infections and diseases and also avoid the increased cost and timely response to the needs:

1. Shelf life in ICU

   Determining the average days of hospitalization, based on the total days of hospital stay (stay days of patients) over a period of time divided by the total discharged and the dead during the same period.

2. The raw amount of bedsores in ICU patients (through nursing observation and report).

   Pressure ulcers or bedsores are more likely to occur under relatively *pressured capillaries (32 mm Hg) on the skin surface over long* periods of time, which causes necrosis in the limited area of soft tissues. It should be noted that the bedsore critheria is based on medical and nursing observation and reports by the head nurse of the ward.

3. The nosocomial infections in ICU patients based on nursing reports and the results of laboratory cultures.

   This refers to infections caused 42 to 72 hours after admission. The basis for calculating the amount of nosocomial infections in this study was head nurses' reports, visits to control infection and clear feverish infectious diseases and the results of bacterial cultures.

Data analysis

SPSS 22 was used for data analysis. The indicators of hospital infections and bedsores were qualitative indicators. A chi-square test was used to study the significance of the relationship between accreditation and the mentioned indicators. This was used due to the fact that Pearson's chi-square test was established for this test (i.e., 0% of the cells, the value was less than 5). Also, ANOVA test was used in terms of shelf life indicator in ICU wards, which is a quantitative indicator. $P>0.05$ was selected as the significance criterion.

RESULTS

In this study, 6997 patients requiring the center's care were admitted to intensive care units of the Imam Reza Hospital from the beginning of 2013 to the end of the second half of 2015. They

were admitted in five units with a total of 79 special beds by the wards' doctors considering the priorities, especially critical trauma patients, patients with major surgeries and patients with advanced and multi-dimensional internal diseases, such as oncology, pulmonary, neurological, and the gastrointestinal and received medical care services. Selected indicators among all patients in the study were studied and analyzed as follows.

Pressure ulcers or bedsores indicators

Based on the findings of the study, the effect of accreditation intervention on the percentage of patients with bed sores during the two and a half-year period of implementation was positive with researchers witnessing a decrease in the percentage of its original value from 6.8 percent to 4.1 percent. Table 1 has demonstrated changes in relation to the indicator in five six-month periods.

Table 1. The incidence of pressure ulcers in patients in the selected ICU wards in terms of the number and percentage in the separation of the six-month period related to applying accreditation standards.

Period	Pressure Ulcer		Total
	Pressure Ulcer (%)	No Pressure Ulcer (%)	
1	100 (6.8%)	1367 (93.2%)	1467
2	85 (5.8%)	1368 (94.2%)	1453
3	79 (5.6%)	1327 (94.4%)	1406
4	76 (5.2%)	1383 (94.8%)	1459
5	50 (4.1%)	1162 (95.9%)	1212
6	390 (5.6%)	6607 (94.4%)	6997
Total			6997 (100%)

According to the table above, the relative improvement calculated for this indicator is 2.7%. Given that ($p=0.045$) was obtained by the chi-square test carried out on this indicator, it could be said that the increase in the reported bedsores mean was almost significant.

Nosocomial infections

The results of nosocomial infections were contrary to the bedsores indicator, and that was unexpected. During the study, it was observed that the percentage of nosocomial infections was considerably increased so that it rose from 1.5 percent to 8.1 percent. The information related to this period of two and a half years is shown in Table 2. It should be noted that with regard to

accessibility of the available data summary on this indicator, relevant figures include two periods of one year and a six-month period. Given that $p=0.001$ was obtained by the chi-square test carried out on this indicator, it could be said that the observed increase in the mean of reported nosocomial infections was completely significant.

Table 2. The incidence of nosocomial infection in patients in the selected ICU wards in terms of the number and percentage in the separation of two one-year period and one two-month period related to applying accreditation standards.

Period	Infection		Total (n)
	With Infection (%)	Without Infection (%)	
1 (1 year)	45 (1.5%)	2875 (98.5%)	2865
2 (1 year)	99 (3.5%)	2766 (96.5%)	1212
3 (6 month)	242 (3.5%)	6755 (96.5%)	6997

Length of Stay

In terms of the staying length, since deviation values were not much different from the mean length of stay, one-way ANOVA was used. The available data for five 6-month periods of the study is shown in the following table.

Table 3. Length of stay among patients during accreditation standards implementation.

Period	N (count)	Mean	Std.Dev
1	1467	11.58	12.00
2	1453	11.02	13.83
3	1406	11.07	11.60
4	1459	10.60	12.83
5	1212	10.13	10.00

According to the table above, the average stays of patients admitted to ICUs during the study, rose from average of 1.58 days in the first half of 2013 to an average of 10.13 days, with the relative improvement of 1.45. Regarding the p-value obtained from ANOVA analysis ($p = 0.0303$), it can be claimed that the changes in the average length of stay in the ICU over time is significant.

DISCUSSION

The findings of this study showed that significant differences in three areas related to quality of service provision and patient safety (number of bedsores, hospital infections and hospitalization days) were achieved through implementation of an accreditation program. The indicators associated with pressure ulcers have showed a significant reduction, hospital infection unexpectedly showed a significant increase and the average hospital stay showed a significant decrease. As seen, accreditation interventions are

not just a positive effect at first glance, negative consequences appear to have followed as well. An example of this in this study is nosocomial infections, for which an increase was reported.

Based on the results of this study, bedsore indicators decreased from 8.6 percent to 1.4 percent as a result of intervention, demonstrating the positive impact of accreditation interventions on the improvement of service quality provision and ultimately patient safety. The interventions were in the form of several operational programs, including proper evaluation of the patients by nurses, especially in terms of susceptibility to nosocomial infections, right and timely dressing, providing raging mattresses, changing the position of the patients at least every two hours, organizing bed sore reports and follow-up bedsore care are the most important accreditation interventions.

None of these programs were in place before the accreditation program or they were not in an organized form. These interventions lead to relative growth of 7.2 percent in the mentioned indicators, which certainly represent service quality improvement and patient safety. A study by Thorn low et al. also showed that accreditation lead to a significant reduction in cases of bedsores in patients, which was consistent with the findings of our study.[13]

Based on the results of this study, the nosocomial infections indicator rose from 1.5 at the beginning of the study to 8.1 at the end of the study. However, most studies[13-15] showed a reduction as a result of accreditation interventions. Comparing the amount of nosocomial infection with relevant standards reported 2-7% in the various scientific resources in developed countries, it seems essential to note that the researchers claim that the increase in nosocomial infection is not due to unincreased in the incidence of nosocomial infections, it is due to lack of accurate reporting and recording cases of nosocomial infection at the start of the study.

During the study, the nosocomial infection cases were relatively well–recorded through training and organizational culture related to patient safety, risk management and error report.

In terms of changes in the indicator related to nosocomial infections, it can be claimed that accreditation interventions such as establishment of policies related to infection control (hand hygiene, sterile process improvement, following up the results of laboratory cultures, examining all suspicious cases in less than 24 hours for typical infectious consulting and immediately for emergency infectious consulting and readmission due to infection reports) was definitely improved compared to the past. As already mentioned, this increase was due to good reporting and recording of nosocomial infectious cases, which was not well-organized in the past.

In this study, the effect that the accreditation interventions indicator had on the patient length of stay in intensive care units demonstrated reduced length of stay from an average of 11.58 days to 10.13 days, which on average represents about a 1.5 day (12%) reduction in the indicator. In addition to the impact on reducing the costs imposed on health systems and hospitals and patients, this accelerates the provision of timely services to patients in the waiting list needing intensive care, which ultimately leads to health improvement.

To improve this indicator, it can be stated that all interventions involved in establishing accreditation standards, the most important of which can be patient assessment management for entering and exiting from the ICU to general wards, coordinating, continuing and integrating medical, clinical and counseling orders. In this regard, a study conducted by Falstie-Jensen et al. on the effect of accreditation interventions on patient stay length in general hospitals (non-psychiatric) represented 7% decrease of this indicator due to accreditation intervention implementation,[16] which is consistent with results of our study.

CONCLUSION

With regards to the discussion, if we would generally like to conclude the effect of accreditation interventions related to patient safety and quality of services indicators in hospitals, their positive and negative impacts can be seen at a quick look. However, the truth is quite different from this glance. This means that, in fact, the examined indicators in the study were certainly improved.

It is clear that an accreditation program should be regarded as an opportunity and a clear practical guide for organizations providing health services and their senior managers to improve service quality and patient safety. So it is essential that senior managers of the Ministry of Health, Treatment and Medical Education and lower level managers of Health and Treatment Organizations, including hospitals, seize the opportunity and commit to emphasize the importance of the accreditation program also the establishment of related standards. In addition, in order to ensure the quality and safety of services and ensure the adherence of senior managers of medical and educational centers and hospitals, it is recommended that program indicators related to patient safety and service quality improvement be defined in accreditation programs. The hospitals should be notified and reminded that maintaining the hospital's accreditation degree depends on preserving and promoting these services.

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