

## Impact of Accreditation on Improvement of Hospital's Infection Control Programs Quality and Safety in Saudi Arabian Hospitals

Asaad A Abduljawad\*

Department of Public Health, College of Health Sciences, Umm Al-Qura University, Prince Sultan Road, Makkah, Kingdom of Saudi Arabia

### ABSTRACT

Accreditation of healthcare organizations is thorough evaluation process performed by an external accrediting body that assesses the quality of systems and processes in healthcare organizations. There are numbers of accrediting organizations or bodies worldwide. In 2006, the ministry of health in the Kingdom of Saudi Arabia established the national healthcare accrediting body and coined the name of the Central Board of Accrediting Healthcare Institutions (CBAHI). In 2016, CBAHI implemented a thorough public safety program, including 20 standards that are enforced on all public and private sectors no matter what the accreditation status is, and referred to as the Essential Safety Requirements (ESR). Infection Prevention and Control (IPC) chapter of standards covers a plethora of issues, such as Infection control program, staff education, use of personal protective equipment, hand sanitation, sharps disinfection etc. The purpose of this study was to evaluate the level of improvement of the ESR infection and prevention control (IPC) standards improvement in all Saudi hospitals after the first three years of implementing CBAHI's ESR. The study aims to find out with primary source data if accreditation improved infection control in hospitals and the correlation between the ownership, bed size/capacity.

Our findings show that the quality of Infection control structures, processes, and outcomes improved with time after implementing and applying the ESR CBAHI standards. The quality of infection control programs is slightly better in private hospitals versus the private and public sector. There was a weak association between the hospital size and the quality of application of infection control standards.

**Key words:** Hospital accreditation, Healthcare quality, Infection control, CBAHI, JCI, Standardization, ESR, IPSC

**HOW TO CITE THIS ARTICLE:** Asaad A Abduljawad, Comparative Study on Efficacy, Impact of Accreditation on Improvement of Hospital's Infection Control Programs Quality and Safety in Saudi Arabian Hospitals, J Res Med Dent Sci, 2022, 10 (9):14-19.

**Corresponding author:** Asaad A Abduljawad

**e-mail**✉: AAbduljawad@uqu.edu.sa

**Received:** 27-August-2022, Manuscript No. JRMDS-22-73074;

Editor assigned: 29-August-2022, **PreQC No.** JRMDS-22-73074(PQ);

**Reviewed:** 13-September-2022, QC No. JRMDS-22-73074(Q);

**Revised:** 16-September-2022, Manuscript No. JRMDS-22-73074(R);

**Published:** 23-September-2022

### INTRODUCTION

Accreditation of healthcare organizations is a voluntary and thorough evaluation process performed by an external accrediting body that assesses the quality of systems and processes in healthcare organizations. It is a growing activity that includes an assessment of services delivered, such as preventive services and patient's satisfaction, and there is inadequate evidence of the effectiveness of its programs and interventions [1]. Accreditation started in the United States in the 1950's when the college of surgeons started standardizing healthcare services and introduced what evolved to be

the Joint Commission (TJC) today [2]. The year 1994 brought with it the Joint Commission International (JCI) aiming to heighten patient safety with its set of standards and thus improve the quality of care. A task force with a multinational representation worked together to develop new unified standards [3]. There are numbers of accrediting organizations or bodies worldwide where some of these organizations were developed and funded by the governments of those countries while others are quasi-governmental and not-for-profit organizations that are supported by national governments and key healthcare players and agencies [4]. In 2006, the ministry of health in the Kingdom of Saudi Arabia established the national healthcare accrediting body and coined the name of the Central Board of Accrediting Healthcare Institutions (CBAHI) [5]. This Saudi accrediting body would become the primary organization to be responsible for accrediting all healthcare organizations in the Kingdom that are licensed to render health services and developed their first set of hospital standards. CBAHI and JCI based their standards and principles to be set by the International

Society for Quality in Healthcare (ISQua) [6], in addition to using the Joint Commission's standards in the U.S. as their core [7]. Fundamental concepts of these standards were structured and based on quality management and continuous quality improvement theories, which are philosophical developments by gurus and scholars in healthcare, engineering, statistics, and finally medicine. These philosophers include Deming, Juran, Crosby, Shewhart, and Donabedian [8]. The IOM defined six attributes of healthcare quality in their study, "Crossing the Quality Chasm," in 1998, and gave it the acronym STEEEP, of which the S pertains to patient safety and was the priority among improvement endeavors of the healthcare [9]. The primary concern of this committee was to inscribe and focus on patient safety as a significant healthcare and quality issue. They aimed at supporting performance expectations, structures, and functions to reduce errors in healthcare and improve quality by the enhancement of patient safety. The committee published the "To Err is Human" report, which had a significant influence on the medical practice [10].

For decades, medical and healthcare providers have been exclusively responsible for the quality of services they offer. Hospitals, healthcare organizations, and healthcare providers have been notorious for hindering quality improvement programs due to excessive time spent and focus on keeping up these programs rather than using the zealotry of these improvement practices. With the rise in consumer awareness, quality of healthcare became very important worldwide. In the Kingdom of Saudi Arabia, healthcare is in transition and transformation of quality of services in the vision 2030 initiatives [11], which has resulted in variation in both provider and patient experiences. Accreditation and its standards would cause consistent expectations and almost a unified delivery where healthcare providers are challenged, classified, and judged according to their ability to maintain quality. Physicians are held responsible for improving quality and patient safety [12].

In 2003, The Joint Commission enacted a set of hospital safety standards that were developed a year earlier called the National Patient Safety Goals (NPSG). Screening

against these standards in hospitals in the United States seeking TJC accreditation is a requirement fulfilling these standards to get accredited [13]. Three years later, in 2006 and based on these national goals, JCI introduced the International Patient Safety goals [14]. In 2016, the Saudi national accrediting body CBAHI implemented a thorough public safety program, including 20 standards that are enforced by all public and private sectors no matter what the accreditation status is, referred to as the Essential Safety Requirements (ESR) [15].

CBAHI introduced in the 3rd edition of standards in 2016. Infection Prevention and Control (IPC) chapter of standards covers a plethora of issues, such as Infection control program, staff education, personal protective equipment, hand sanitation, sharps disinfection and sterilization, hospital acquired infections (HAI), employees' health, communicable diseases, waste management, laundry management, and facility construction precautions. In this 3<sup>rd</sup> edition of standards, there are 44 IPC standards (that are listed with 1 digit in the manual), and 203 sub-standards (with 2 digits), and 52 measurable elements (with 3 digits), all of which are part of the IPC chapter.

The IPC standards in specific are 2 out of the total of 20 ESR standards in the 2016 manual. IPC 4 that comprises 4 sub-standards and 6 measurable elements, besides IPC 15 with 8 sub-standards and 6 measurable elements that CBAHI has mandated to be part of the ESR monitoring and surveys, summarized as shown in the following Tables 1 and 2.

Infection prevention control programs and activities are an essential part of TJC [16], JCI [17], and CBAHI [18], and their hospital standards are part of clinical and administrative activities fulfilling accreditation and patient safety requirements. Although there are various suggestions and a wide variety of testimonials of performance improvement in the healthcare sector after getting accredited, there are no sufficient and efficient quantitative empirical studies conducted to date to explain the overall advantages, gains, and effects of standardization achieved by accreditation on

**Table 1: IPC4 standard. There is a designated multidisciplinary committee that provides oversight of the infection prevention and control program.**

IPC.4.1	The infection prevention and control committee is chaired by the hospital director or the medical director.
IPC.4.2	The membership of the infection prevention and control committee includes representatives from the medical staff, nursing staff, microbiology, operating room, central sterilization service, pharmaceutical care, dietary services, housekeeping, infection prevention and control staff, and other departments as needed.
IPC.4.3	The infection prevention and control committee meet on a regular basis (at least quarterly).
	Functions of the infection prevention and control committee include, but are not limited to, the following:
	IPC.4.4.1 Review of the hospital infection prevention and control policies and procedures.
	IPC.4.4.2 Review of the reports of healthcare-associated infections surveillance submitted regularly by the infection prevention and control team and suggestion of appropriate actions.
	IPC.4.4.3 Revision of the yearly plan submitted by infection prevention and control team and suggestion of additions/changes if necessary.
IPC.4.4	IPC.4.4.4 Evaluates and revises on a continuous basis the procedures & the mechanisms developed by the infection prevention & control team to serve established standards and goals.
	IPC.4.4.5 Brings to the attention of the infection prevention & control team new infection control issues arising in different departments of the hospital & suggests solutions.
	IPC.4.4.6 Each member of the committee acts as an advocate of infection prevention & control in his department, trying to promote its principles, and ensures application of its rules.

**Table 2: IPC 15 standard. Facility design and available supplies support isolation practices.**

IPC.15.1	There is at least one negative pressure airborne isolation room in the emergency room and one in patient care areas (one negative pressure room for every 25-30 beds in general hospitals).
IPC.15.2	The infection prevention and control team decide the need for more airborne isolation rooms depending on the volume of patients in need for airborne isolation admitted to the hospital.
IPC.15.3	The ventilation system serving airborne isolation facilities provides pressure patterns that prevent airborne pathogens from being distributed to other areas of the hospital.
	IPC.15.3.1 Rooms designed for airborne isolation patients are under negative pressure.
	IPC.15.3.2 Air is exhausted to the outside and is not re-circulated unless it is filtered through High-Efficiency Particulate Air (HEPA) Filter.
	IPC.15.3.3 There is evidence of daily air exchange monitoring (12 air changes per hour) when a patient is isolated. Weekly monitoring of the air exchange is needed when no patient is isolated.
IPC.15.4	The entry of the isolation room is through a work area or anteroom that serves as a site for hand washing, gowning and storage of protective clothing (gloves, aprons, masks).
IPC.15.5	Toilet, shower, or tub and hand washing facilities are provided for each isolation room.
IPC.15.6	Transmission-based precaution cards (isolation signs) are consistent with the patient diagnosis and are posted in Arabic and English and indicate the type of precautions required.
	IPC.15.6.1 Transmission-based precaution cards (isolation signs) are color coded for isolation of different categories (e.g., contact: green, airborne: blue, droplet: pink or red).
	IPC.15.6.3 Isolation instructions must highlight the transmission-based precaution cards (isolation signs) needed while transporting the patients under transmission-based precautions to other department (e.g., radiology).
IPC.15.7	Respirator (high filtration) masks (N-95, N-99) are used by staff during direct care of patients on airborne precautions and are available on all units likely to admit patients on airborne precautions.
IPC.15.8	Respirator (high filtration) masks (N95, N-99) can be reused by the same patient care giver as per the period specified by the manufacturer.

the quality of healthcare services specifically CBAHI standardizations on infection control activities and programs with none in the literature supported by primary source data.

The purpose of this study was to evaluate the level of improvement of the CBAHI ESR infection and prevention control (IPC) standards improvement in all Saudi hospitals after the first three years of implementing CBAHI's ESR. The study aims to find out with primary source data if accreditation improved infection control in hospitals and the correlation between the ownership, bed size/capacity, and improvements in IPC using primary source data extrapolated from the accrediting body.

## METHODS

The population initially targeted in this study was all the 489 private, public, and governmental hospitals licensed to operate in the Kingdom of Saudi Arabia that had the Infection control standards from the ESR survey analyzed and reported during the 3 consecutive years visit of CBAHI surveyors between 2016-2018. The sample that is included in this study are 440 hospitals that fit the inclusion criteria, as this investigation excluded those hospitals that did not get at all 3 annual visits between 2016-2018. Data was collected after the researcher signed a confidentiality agreement with CBAHI at their headquarter offices in Riyadh, Saudi Arabia, and the results of this study will be published as group findings. The researcher indicated that hospital information and identities will be kept confidential and anonymous. The final two scores of both standards IPC 4 and IPC15, out of 100 for each hospital were provided by the accrediting body after summing and accumulating results for all 440 hospitals in a Microsoft excel spreadsheet. Also, ownership which are either governmental versus

private, or the number of beds for each hospital was included. Data was fed into SAS 9.4 statistics software for statistical analysis to answer the study's questions.

## RESULTS

To differentiate between results of means of hospital scores of 3 or more years and to quantitatively measure advancement or worsening of quality over these years, when these same participating or sampled hospitals are subject to the same IPC 4 and 15 repeated measurements over the years, statisticians use the mixed design analysis also named the split-plot analysis of variance (ANOVA) test [19]. The final sample analyzed had 304 governmental and 136 private hospitals at 69% and 31% respectively. The number of beds ranged from 13 beds to 1205, with an average of 146.72, and a mode of 50, and a median of 100 beds.

From Table 3 analyzing hospital IPC 4 scores from 2016 through 2018, overall scores improved from 78% to 94%. Effect of both hospital ownership type ( $P < 0.06$ ) and year of service ( $P < 0.0001$ ) were significant. Private hospitals did slightly better than government hospitals and were at 88.7% versus 86.0%, respectively.

From Table 4, results of IPC 15 standard show that over the three years period, from 2016 to 2018, overall scores improved from 66% to 70%. For private hospitals, scores improved from 76% to 82%, while for government hospitals, scores improved then consequently decreased. The effect of both hospital types ( $P < 0.0001$ ) and year of service ( $< 0.02$ ) were significant. Additionally, there was a trend for interaction between hospital types and year of performance ( $P = 0.11$ ). Private hospitals did better than government hospitals (80% versus 58%).

Correlating IPC 4 and IPC 15 to the number of beds in hospitals using Pearson's correlation, the data shows

Table 3: IPC 4 mixed design analysis.

Least Squares Means							
Effect	TYPE	YEAR	Estimate	Standard Error	DF	t Value	Pr >  t
TYPE	G		57.7	0.7855	1320	73.46	<0.0001
TYPE	P		79.5462	1.1828	1320	67.25	<0.0001
YEAR		2016	65.8408	1.2335	1320	53.38	<0.0001
YEAR		2017	70.473	1.1031	1320	63.89	<0.0001
YEAR		2018	69.5556	1.3408	1320	51.88	<0.0001
TYPE*YEAR	G	2016	55.2179	1.3742	1320	40.18	<0.0001
TYPE*YEAR	G	2017	61.2096	1.2189	1320	50.22	<0.0001
TYPE*YEAR	G	2018	56.6725	1.476	1320	38.4	<0.0001
TYPE*YEAR	P	2016	76.4636	2.0489	1320	37.32	<0.0001
TYPE*YEAR	P	2017	79.7364	1.8389	1320	43.36	<0.0001
TYPE*YEAR	P	2018	82.4386	2.2388	1320	36.82	<0.0001

Table 4: IPC 15 mixed design analysis.

Least Squares Means							
Effect	TYPE	YEAR	Estimate	Standard Error	DF	t Value	Pr >  t
TYPE	G		57.7	0.7855	1320	73.46	<0.001
TYPE	P		79.5462	1.1828	1320	67.25	<0.001
YEAR		2016	65.8408	1.2335	1320	53.38	<0.001
YEAR		2017	70.473	1.1031	1320	63.89	<0.001
YEAR		2018	69.5556	1.3408	1320	51.88	<0.001
TYPE*YEAR	G	2016	55.2179	1.3742	1320	40.18	<0.001
TYPE*YEAR	G	2017	61.2096	1.2189	1320	50.22	<0.001
TYPE*YEAR	G	2018	56.6725	1.476	1320	38.4	<0.001
TYPE*YEAR	P	2016	76.4636	2.0489	1320	37.32	<0.001
TYPE*YEAR	P	2017	79.7364	1.8389	1320	43.36	<0.001
TYPE*YEAR	P	2018	82.4386	2.2388	1320	36.82	<0.001

Table 5: Pearson's Correlation between Number of beds and IPC 4 and 15.

	NOB1	IPC04	IPC15
NOB1	1	0.18924	0.24538
NOB1		<0.001	<0.001
IPC04	0.18924	1	0.38251
IPC04	<0.001		<0.001
IPC15	0.24538	0.38251	1
IPC15	<0.001	<0.001	

\*NOB Number of beds

that there is a very weak association between size of healthcare institution in addition to no effect of the number of beds on the improvement of the infection control program in these hospitals over the years when applying accreditation and CBAHI ESR standards on them from 2016-2018 (Table 5).

## DISCUSSION

The assessment of the improvement of infection control program measurement standards, and the quality and safety at hospitals that go through a rigorous accreditation process are measured quantitatively. In this evidence-based study with primary source data, results of this investigation are coherent with previous studies that patient safety and the quality measures improve by time and over the years and are a result of the application of hospital accreditation [20]. In a systemic review of over 17000 publications Hussein et al. concluded in their study that accreditation is associated

with better safety, processes, efficiency, and both staff and patient increased satisfaction [21].

It is a debatable topic determining if private hospitals outperform public hospitals and provide better, safer, and high standard of quality care. In most European countries the overall quality provided by governmental hospitals are equally compared to those private counterparts. That could be due to many reasons, such as the recent introduction of private hospitals to some European healthcare systems in recent years [22]. However hospitals in Nordic countries are totally publicly run and operated, where it is difficult to benchmark with private hospitals, and in a systemic review done on western European countries, Kruse et al. concludes that there is no major differences in quality of care between private and public hospitals [23]. The results of this study indicate that private hospitals had better performance pertaining to infection control quality structures, processes, and outcomes. This could be due to several reasons such as private hospitals

especially those for-profit must get accredited to renew their operating licenses in the Kingdom of Saudi Arabia, compared to governmental hospitals that are owned by the Saudi government and could be the only operating healthcare entity in some cities and towns. Another factor to be taken into consideration is that the government owns more hospitals than those that are private, and another study could be designed to compare the top fifty hospitals of both private and public according to several quality measures.

Quality of healthcare delivered in hospitals could be correlated to the hospital size determined by the number of beds. Large hospitals show that the quality of healthcare is lowest when compared to smaller hospitals [24], however the results show that hospital size nor number of beds have any significant correlation with the safety of infection control standards and programs at Saudi hospitals. That could be because universal infection control precautions should be followed whatever the healthcare size or setting is.

Another point to consider regarding healthcare quality, besides accreditation, is the wide gap that prevails between evidence-based best practices and treatment practices day-to-day clinical medicine. Indeed, the "Closing the Quality Gap" series is an excellent resource, as it reflects on care coordination, a planned system of patient care operations involving several participants, as well as the patient [25].

The IOM has identified care coordination as one of the twenty national priorities for action to improve healthcare quality along its six dimensions. Care coordination interventions are particularly attractive in that they have the potential to improve both efficiency and quality. However, as the number of aging people with chronic illnesses expands, together with the ever-increasing complexity of care, challenges are created to care coordination endeavors at all levels: The patient, the clinical practice, and other components of the health system. The concern here is identifying which techniques would promote the adoption of clinical evidence-based best practices that support intervention. Some of the suggested mediations are using tools to prompt a clinician to recall information, prompt of specific care processes like medication adjustments, facilitation of relay of clinical data to providers, patients' education and reminders, promotion of self-management such as education on the usage of devices for blood pressure or glucose self-monitoring. Indeed, developing measures and approaches to investigate the efficiency and quality of care coordination interventions.

### CONCLUSION

In conclusion with this study results, the Saudi healthcare system and hospitals around the kingdom improved in their implementation of infection control measures over the years with the introduction of healthcare

accreditation and specifically the ESR standards and is an example to be followed for those systems that strive for better quality of healthcare.

### REFERENCES

1. Brubakk K, Vist GE, Bukholm G, et al. A systematic review of hospital accreditation: the challenges of measuring complex intervention effects. *BMC Health Services Res* 2015; 15:280.
2. Leape LL. *Enforcing standards: The joint commission. Making Healthcare Safe.* Springer 2021; 185-202.
3. Campa M, Riva P, Oricchio G, et al. Association between patient outcomes and Joint Commission International (JCI) accreditation in Italy: An observational study. *Calitatea* 2021; 22:93-100.
4. Mansour W, Boyd A, Walshe K. National accreditation programmes for hospitals in the Eastern Mediterranean Region: Case studies from Egypt, Jordan, and Lebanon. *Int J Health Plann Manage* 2021; 36:1500-1520.
5. Al-Surimi K, Najjar S, Al Quidaihi A, et al. The impact of a national accreditation program on patient safety culture in a tertiary hospital: Pre-and post-evaluation study. *Global J Quality Safety Healthcare* 2021; 4:18-26.
6. Alanazi B. An assessment of quality management systems and practices in general hospitals in Kingdom of Saudi Arabia (KSA): Towards initiating a holistic framework (Doctoral dissertation, Manchester Metropolitan University) 2021.
7. Zhu L, Zhu L, Yang X, et al. The efficacy of the problem management model based on the core concept of JCI in gastric polyp patients. *Am J Translational Res* 2021; 13:6552.
8. Organization WH. *Health care quality: An international perspective: WHO Regional Office for South-East Asia* 2001.
9. Institute of Medicine Committee on Quality of Health Care in A. *Crossing the Quality Chasm: A New Health System for the 21st Century.* Washington (DC): National Academies Press (US) Copyright 2001 by the National Academy of Sciences. All rights reserved.; 2001.
10. Institute of Medicine Committee on Quality of Health Care in A. In: Kohn LT, Corrigan JM, Donaldson MS. *To Err is human: Building a safer health system.* Washington (DC): National Academies Press 2000.
11. Chowdhury S, Mok D, Leenen L. Transformation of health care and the new model of care in Saudi Arabia: Kingdom's vision 2030. *J Med Life* 2021; 14:347.
12. Cobble Y. Our AMA is leading the way to quality medical care. *Am Med News* 2002; 45:28.
13. Eldridge N, Revere A. JCAHO national patient safety goals for 2006. *Topics Patient Safety* 2005; 5:2-3.
14. <https://www.jointcommissioninternational.org/standards/international-patient-safety-goals/>
15. Alderaihem H, Yaqub A, Laist J, et al. 73 Journey to CBAHI accreditation at national guard health affairs. *Br Med J* 2019.

16. Costa AL, Privitera GP, Tulli G, et al. Infection prevention and control. Textbook of Patient Safety and Clinical Risk Management: Springer 2021; 99-116.
17. Soule BM, Memish ZA. Best practices in infection control: An international handbook: Joint Commission International 2007.
18. Hindawi S. Systems for accreditation in blood transfusion services. ISBT Science Series 2009; 4:14-17.
19. Chartier S, Cousineau D. Computing mixed-design (split-plot) ANOVA. *Mathematica J* 2011; 13:13-17.
20. Abduljawad AA, Kattan W. Perceptions of administrators on the impact of accreditation on patient safety in Gulf cooperation council hospitals. *Am J Med Quality* 2021; 36:293.
21. Hussein M, Pavlova M, Ghalwash M, et al. The impact of hospital accreditation on the quality of healthcare: A systematic literature review. *BMC Health Services Res* 2021; 21:1-12.
22. Maarse H. The privatization of health care in Europe: An eight-country analysis. *J Health Politics Policy Law* 2006; 31:981-1014.
23. Kruse FM, Stadhouders NW, Adang EM, et al. Do private hospitals outperform public hospitals regarding efficiency, accessibility, and quality of care in the European Union? A literature review. *Int J Health Planning Management* 2018; 33:e434-e53.
24. El-Jardali F, Jamal D, Dimassi H, et al. The impact of hospital accreditation on quality of care: perception of Lebanese nurses. *Int J Quality Health Care* 2008; 20:363-371.
25. McDonald KM, Sundaram V, Bravata DM, et al. Closing the quality gap: A critical analysis of quality improvement strategies. *Care Coordination* 2007; 7.