

Assessing the Presence of the Joint Commission International Accreditation Requirements in Western Saudi Arabia Hospital Pharmacies: A Cross-sectional Study

Ahmed Ibrahim Fathelrahman¹, Huda Abdullah Almalki², Hanan Rashad Bajunaid³, Ghaidaa Khalid Al-Harathi², Manal Omar Aljuaid², Ruqayyah Yahya Majrashi⁴, Mohammed Abdullah Alsuwat¹

¹Department of Clinical Pharmacy, College of Pharmacy, Taif University, Taif, Saudi Arabia

²College of Pharmacy, Taif University, Taif, Saudi Arabia

³Department of Community Pharmacy, Kol Alosra, Taif, Saudi Arabia

⁴United Pharmacy, Taif, Saudi Arabia

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INTRODUCTION

Accreditation refers to the formal evaluation process that allows institutions to demonstrate their ability to meet official regulatory requirements and

ABSTRACT

Objective: The Central Board of Accreditation for Healthcare Institutions (CBAHI) the national Saudi accreditation body accredited most hospitals in Saudi Arabia whereas, the Joint Commission International (JCI) a well-known international accreditation body accredited some hospitals. We assessed Western Saudi Arabia hospital pharmacists' knowledge, opinions, and observations about pharmacy-related JCI accreditation criteria needed for hospitals. **Methods:** This was a cross-sectional survey-based study conducted among pharmacy personnel working in the Ministry of Health (MOH), Military, and private hospitals in the Makkah region in western Saudi Arabia. The present report represents the findings of descriptive and comparative analyses. Comparative analyses were tested by Student's *t*-test, analysis of variance, and Chi-square when applicable and a $P \leq 0.05$ was considered statistically significant. **Findings:** One hundred and one pharmacists completed the survey; most of them were from Taif (53.5%) and Jeddah (37.6%) and fewer from Makkah (8.9%). The highest proportions were from MOH (55.4%), private (29.7%), and some from military (14.9%) hospitals. They worked mostly in hospitals accredited with CBAHI (93.1%) than JCI (58.4%) and only (41.6%) worked with quality units. Correct answers on knowledge items ranged from 14.9% to 65.3%. On five-point Likert Scale, they showed supportive ratings on how they perceived the importance of JCI statement provided (overall average score: 3.78) and on how statement criteria are implemented in their hospitals (overall average score: 3.76). Higher proportions of those working in quality units compared to their counterparts were aware that accreditation cycles for JCI and CBAHI are identical (66.7% vs. 55.9%, $P = 0.009$) and that JCI criteria are more concise than CBAHI (59.5% vs. 52.5%, $P = 0.007$). Higher proportions of those working in JCI-accredited hospitals compared to their counterparts were aware that JCI criteria are clearer than CBAHI (55.9% vs. 33.3%, $P = 0.021$) and that JCI criteria are more concise than CBAHI (61% vs. 47.6%, $P = 0.012$). **Conclusion:** To a high extent, pharmacists were supportive of JCI criteria and considered the criteria to be implemented in their hospitals. There is a room for improvement to enhance awareness and support of JCI quality criteria among pharmacists.

KEYWORDS: Accreditation, awareness, Central Board of Accreditation for Healthcare Institutions, hospital pharmacy, joint commission international

Address for correspondence:

Dr. Ahmed Ibrahim Fathelrahman,
E-mail: aihassan@tu.edu.sa, afathelrahman@yahoo.com

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quality standards.^[1] A health-care facility undergoes an examination of its systems, processes, and performance by reviewers to ensure that all are conducted in a manner that meets applicable predetermined and published international or national standards.^[2] Requirements vary depending on the accrediting organization, but the goal remains the same: To prove a health-care organization's commitment to meeting accreditation standards resulting in a higher level of performance and a greater focus on patient care.^[1]

In October 2005, the Central Board of Accreditation for Healthcare Institutions (CBAHI) was established by the Saudi Ministry of Health (MOH). MOH made it mandatory for all health facilities to acquire accreditation from CBAHI.^[3] In addition, many private and governmental hospitals in Saudi Arabia pursue accreditation from some international accreditation bodies. However, most of them tend to have accreditation from the Joint Commission International (JCI) which is an official American authority established in 1994 to give accreditation certificates to health-care institutions in the United States of America.^[4]

There is abundant worldwide literature on hospital accreditation which can be categorized as follows: (a) literature assessing health-care professions accreditation-related knowledge, attitudes, views, and readiness,^[5-8] (b) literature assessing hospitals' accreditation status and lessons learned from accreditation exercise,^[9,10] (c) literature assessing the impact of accreditation on quality of services and patients' outcomes,^[11-20] and (d) literature assessing patients and staff satisfaction with accreditation.^[21-24] Locally, a couple of studies assessing directly or indirectly the accreditation of hospitals and other health-care organizations were conducted in Saudi Arabia.^[25-31] For example, a self-administered survey distributed to the patients in three CBAHI-accredited primary care centers located in Hail region, Alqunfatha region and Alquateef region revealed very good satisfaction with pharmaceutical care.^[25] A study conducted at a single teaching hospital in Khobar, Saudi Arabia, revealed an improvement in nine out of 12 assessed outcomes including the average hospitalization period, the rate of hand hygiene compliance, the rate of nosocomial infections, the proportions of radiology reporting outliers, the rate of pressure ulcers, the percentage of the correct identification of patients, the percentage of critical lab reporting, and the bed occupancy rate.^[26] A qualitative component of the same study indicated that respondents were supportive of the accreditation process.^[26] A retrospective and prospective study conducted at King Abdulaziz University Hospital (KAUH), which received a Canadian accreditation, indicated a positive impact

of accreditation process on patient safety and quality of care.^[27] A study in King Khalid Hospital in Hail city, Saudi Arabia involving 200 nursing staff proved a positive impact of the JCI accreditation on healthcare environment, processes, outcome, and patient's satisfaction.^[28] Another study at King Abdulaziz Medical City in Jeddah, Saudi Arabia, found that the impact of JCI accreditation was positive as it improved in the delivery of patient care and other health services.^[29] A cross-sectional retrospective and prospective study postaccreditation at KAUH in Jeddah, Saudi Arabia revealed a significant improvement in the perception of the culture of patient safety among 605 registered nurses from different cultural backgrounds and hospital units.^[30] On the other hand, a study assessing the impact of CBAHI accreditation on quality of care in three accredited Saudi public hospitals showed no effect from accreditation on quality outcomes despite noted improvements in certain procedures.^[31]

To the best of our knowledge, no study was conducted in Saudi Arabia to assess the pharmacists' readiness for hospital accreditation, particularly the JCI standards. Most hospitals in Saudi Arabia are accredited with CBAHI the national accrediting body and fewer hospitals are accredited with JCI.^[32] This is because CBAHI is mandatory whereas JCI is optional. However, JCI accreditation for some hospitals means international recognition which helps attract distinguished international practitioners and medical specialists. This would further improve the public image of the institution and improves the provided care. The main goal of the present study was to assess hospital pharmacists' knowledge, views and opinions, and practice regarding the pharmacy-related JCI hospital accreditation criteria.

METHODS

This was a cross-sectional study that was conducted among pharmacy personnel working in pharmacy departments in Makkah region, Saudi Arabia, to assess their knowledge, views and opinions, and practice toward pharmacy-related quality criteria needed for hospital accreditation. The target study population was hospital pharmacy personnel working in pharmacy departments. We focused on the main governmental besides large private hospitals in the region where Taif University pharmacy students regularly receive their advanced and early pharmacy practice experiences. Hospitals from different types (i.e., MOH., military, and private) in Makkah region (Taif, Jeddah, and Makkah governorates) were eligible for inclusion regardless of the accreditation status (i.e., including CBAHI-accredited vs. JCI-accredited as well as nonaccredited hospitals). We were interested to compare participants' responses by hospital type (i.e., MOH., military, and private), geography (i.e.,

Taif, Makkah, and Jeddah), and accreditation status. Within included hospitals, all personnel (i.e., pharmacists, senior pharmacists, and pharmacy technicians) working in pharmacy departments were eligible for inclusion including those working in the quality units but considered among pharmacy department staff. The study did not include temporary working personnel such as those doing attachments, training, and pharmacy interns.

Due to the absence of a sampling frame, we used a convenience sampling technique to recruit the participants. All pharmacy personnel working in the pharmacy departments of the hospitals approved the study and who were available at the time of study and agreed to participate were surveyed. To the best of our knowledge, no accurate statistics were available about the numbers of pharmacy personnel working in the three populous governorates of Makkah region (i.e., Taif, Makkah, and Jeddah) including those working in MOH, military, and private hospitals. However, according to AlRuthia *et al.*, the number of all pharmacy workforce working in Makkah region represents 25% of all licensed workforce across Saudi Arabia (sectors other than hospitals include community pharmacies, academia, and others).^[33] The same source estimated the numbers of pharmacy workforce working in nonmilitary governmental institutions, military health-care institutions, and private health-care institutions throughout Saudi Arabia to be 4224, 632, and 3428, respectively. Calculating 25% of each category and then calculating the sum of these gave a total of 2071 pharmacy personnel working in the MOH hospitals, military hospitals, and private hospitals in Makkah Province. Based on that we estimated that surveying about 207 pharmacy personnel (i.e., 10% of the pharmacy workforce estimated to be working in Makkah Province in the three sectors) will likely be suitable for representing the target study population.

Data were collected between February and May 2022. The survey was prepared to be self-administered as an online version using Google Forms. It was distributed to the pharmacy personnel working in pharmacy departments with an attached cover letter after securing permission from their hospital administrations. The survey links were passed to the working pharmacy staff through their head of departments. Thus, it was not possible to make records on the nonresponse. The researchers made several follow-ups with those heads of departments to remind them to pass the survey to all eligible pharmacy staff in their departments.

The main outcomes were pharmacists' awareness of JCI criteria, to what extent JCI criteria are important from the pharmacists' point of view, and to what extent they

are implemented in the hospitals. The questionnaire was designed specifically for this study. The questionnaire was structured containing close-ended questions arranged under four sections including demographic characteristics, knowledge, views and opinions, and practice. Knowledge questions were answered as agree, disagree, and do not know. Respondents were asked to indicate whether they agree or disagree with the provided statements by ticking on the suitable response. Questions on views and opinions were measured on 5-point Likert scale (5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, and 1 = strongly disagree). Respondents were asked to indicate to what extent the provided criteria are important for improving quality of services by ticking on the suitable response. Responses to the practice questions were measured on a 5-point Likert scale (5 = Always, 4 = Often, 3 = Sometimes, 2 = rarely, and 1 = Never). Respondents were asked to indicate to what extent the provided criteria are implemented in the hospital by ticking on the suitable response.

The number of items (i.e., indicators measuring pharmacy-related standards) in JCI criteria is ninety-one.^[34] This number was reduced to 42 by selecting the most important indicators based on the voting of a panel of five academic researchers who have previous experience in hospital practice. Then, a group of professors in the college of pharmacy were asked to evaluate the survey for face and content validity. Their feedback was used to edit and approve the final version of the survey. Then, the survey was tested on a small sample of pharmacists before administration among targeted hospital pharmacy staff. A pilot study indicated the suitability of the survey and that no further improvements were needed.

Ethical approval was provided by the Taif University Ethics Review Board (reference number: 43-246). Data were analyzed descriptively and comparatively. Results for qualitative variables were presented in tables showing frequencies, and percentages. Quantitative data were the ratings on 5-point Likert scale which was presented as means and standard deviations (i.e., opinions and views/to what extent JCI criteria are important from the pharmacists' point of view and practice/to what extent a criterion is implemented in hospital). Average scores were calculated for every item within opinion and views and practice, and an overall average score was computed for each of the opinion and views and practice. For this study, an average score of ≥ 4 was considered excellent, $3 < 4$: good, $2 < 3$: acceptable (i.e., average), $1 < 2$: poor, and < 1 : very poor. Student's *t*-test, analysis of variance, and Chi-square were used when applicable

to test for significance. A $P \leq 0.05$ was considered statistically significant.

RESULTS

One hundred and one pharmacists completed the survey most of them were from Taif (53.5%) and Jeddah (37.6%) and fewer from Makkah (8.9%). The highest proportions were from MoH (55.4%), followed by private (29.7%) and some from military (14.9%) hospitals. They worked mostly in hospitals accredited with CBAHI (93.1%) than JCI (58.4%) and fewer (41.6%) worked with quality units [Table 1].

Regarding knowledge, about half or more of the participants provided correct answers for the raised inquiries except for two items namely “JCI and CBAHI criteria are identical” and “JCI criteria are more in number than CBAHI” [Table 2]. Correct answers on knowledge items ranged from 14.9% to 65.3%.

On the five-point Likert Scale, participants showed supportive ratings on how they perceived the importance of JCI statement provided (overall average score: 3.78). The criterion that received the highest score was “there is a process for managing medications or products requiring special handling such as hazardous medications, radioactive medications, and investigational medications” (3.94 ± 1.31) and the criterion received the lowest score was “the effectiveness of the antibiotic stewardship program (ASP) is monitored” (3.59 ± 1.42). However, all participants’ ratings of criteria importance were good [Supplementary Table 1].

On the five-point Likert Scale, participants showed supportive ratings on how the stated criteria are implemented in their hospitals (overall average score: 3.76 ± 1.14). Two criteria received the highest score [Supplementary Table 2] namely the statements “the hospital identifies in writing its list of high-alert medications” (3.93 ± 1.27) and “the hospital establishes a definition for a medication error and near miss” (3.93 ± 1.23). The criterion that received the lowest score was “the effectiveness of the ASP is monitored” (3.50 ± 1.36). All criteria were rated high by the participants regarding importance (i.e., >3.5 out of 5). The criterion that received the highest score was “there is a process for managing medications or products requiring special handling such as hazardous medications, radioactive medications, and investigational medications” (3.94 ± 1.31). The criterion that received the lowest score was “the effectiveness of the ASP is monitored” (3.59 ± 1.415).

Table 3 shows comparisons of respondents’ ratings of criteria importance (opinion) by region, hospital type,

Table 1: Participants demographic characteristics

Questions	Category	Frequency (%)
Gender	Male	54 (53.5)
	Female	47 (46.5)
Age (years)	<25	9 (8.9)
	25–34	59 (58.4)
	35–44	26 (25.7)
	45–54	6 (5.9)
	55–64	1 (1.0)
	≥ 65	0
Highest educational degree	Bachelor	37 (36.6)
	Diploma	9 (8.9)
	M pharm	2 (2.0)
	M.Sc.	12 (11.9)
	Ph.D.	2 (2.0)
	PharmD	39 (38.6)
Region	Taif	54 (53.5)
	Makkah	9 (8.9)
	Jeddah	38 (37.6)
Marital status	Single	38 (37.6)
	Married	59 (58.4)
	Divorced	4 (4.0)
	Widow	0
Hospital type	Ministry of Health	56 (55.4)
	Military	15 (14.9)
	Private	30 (29.7)
Nationality	Saudi	90 (89.1)
	Non-Saudi	11 (10.9)
Job title	Pharmacist	59 (58.4)
	Clinical pharmacist	16 (15.8)
	Supervisor	13 (12.9)
	Director	5 (5.0)
	Others	5 (5.0)
	Assistant director	3 (3.0)
Current area of practice	Director	1 (1.0)
	DIC	6 (5.9)
	ICU and/or CCU	7 (6.9)
	In-patient	40 (39.6)
	Others	14 (13.9)
	Out-patient	32 (31.7)
	Satellite pharmacy	1 (1.0)
Hospital accredited by CBAHI	No	7 (6.9)
	Yes	94 (93.1)
Hospital accredited by JCI	No	42 (41.6)
	Yes	59 (58.4)
Working in quality unit	No	59 (58.4)
	Yes	42 (41.6)

CBAHI=Central Board of Accreditation for Healthcare Institution, JCI=Joint Commission International, ICU=Intensive care unit, CCU=Coronary care unit, DIC=Drug information center

working in the quality unit, and accreditation status. The respondents from Taif were significantly more supportive of the importance of JCI than their counterparts [Table 3; $P = 0.020$]. Table 4 shows comparisons of respondent’s ratings of criteria implementation (practice) by

Table 2: Overall respondents' awareness about Joint Commission International and Central Board of Accreditation for Healthcare Institution accreditation standards

Question number	Question	Do not know, F (%)	Wrong answer, F (%)	Correct answer, F (%)
1	Accreditation cycles for JCI and CBAHI are identical (√)	17 (16.8)	18 (17.8)	66 (65.3)
2	JCI and CBAHI criteria are identical (X)	14 (13.9)	61 (60.4)	23 (22.8)
3	JCI criteria are more comprehensive than CBAHI (√)	27 (26.7)	21 (20.8)	53 (52.5)
4	JCI criteria are more concise than CBAHI (√)	33 (32.7)	12 (11.9)	56 (55.4)
5	JCI criteria are clearer than CBAHI (√)	35 (34.7)	19 (18.8)	47 (46.5)
6	JCI criteria are more in number than CBAHI (X)	30 (29.7)	56 (55.4)	15 (14.9)

√=The correct answer, CBAHI=Central Board of Accreditation for Healthcare Institution, JCI=Joint Commission International

Table 3: Ratings of the Joint Commission International criteria importance by respondents' background; region, hospital type, working in quality unit, and accreditation status

Items	Score out of 5, mean±SD	P
Region		
Taif	4.082±0.921	0.020
Makkah	3.709±1.399	
Jeddah	3.381±1.398	
Hospital type		
Ministry of Health	3.656±1.280	0.321
Military	4.177±0.955	
Private	3.829±1.142	
Hospital accredited by CBAHI		
No	3.275±0.771	0.246
Yes	3.823±1.220	
Hospital accredited by JCI		
No	3.705±1.285	0.577
Yes	3.841±1.255	
Working in quality unit		
No	3.872±1.174	0.389
Yes	3.662±1.239	

CBAHI=Central Board of Accreditation for Healthcare Institution, JCI=Joint Commission International, SD=Standard deviation

region, hospital type, working in quality unit, and the accreditation status. There were no significant differences between groups. Table 5 shows respondent's awareness by the background variables, working in quality unit, and the accreditation status. Higher proportions of those working in quality units compared to their counterparts were aware that accreditation cycles for JCI and CBAHI are identical (66.7% vs. 55.9%, $P = 0.009$) and that JCI criteria are more concise than CBAHI (59.5% vs. 52.5%, $P = 0.007$). Higher proportions of those working in JCI-accredited hospitals compared to their counterparts were aware that JCI criteria are clearer than CBAHI (55.9% vs. 33.3%, $P = 0.021$) and that JCI criteria are more concise than CBAHI (61% vs. 47.6%, $P = 0.012$).

DISCUSSION

Hospital pharmacists were expected to show substantial

awareness, support, and readiness for JCI accreditation because some hospitals were already JCI-accredited, and those which were not were accredited by CBAHI. However, actual practice might vary by type of hospital and location. Findings showed: To a high extent, pharmacists in this study were supportive of JCI criteria and reported the implementation of the criteria in their hospitals. Although showing a substantial level of awareness, participants seem to be lacking knowledge regarding two facts about CBAHI and JCI criteria. Most of them were not aware that JCI and CBAHI criteria are quite different and that JCI criteria are less in number than CBAHI. Comparative analyses as shown in Table 5 indicated relatively higher awareness among those working in quality units ($P = 0.009$ and 0.007 for first and fourth items, respectively) and those from CBAHI ($P = 0.039$ for the sixth item) and JCI accredited hospitals ($P = 0.012$, 0.0021 , and 0.013 for fourth, fifth, and sixth items, respectively).

According to participants, the criterion saying that "there is a process for managing medications or products requiring special handling such as hazardous medications, radioactive medications, and investigational medications" is the most important quality criteria within items assessed. The two criteria mostly implemented were "the hospital identifies in writing its list of high-alert medications" and "the hospital establishes a definition for a medication error and near miss." Those are very important findings since they are all supportive of patient safety. Nekoei-Moghadam *et al.*, findings showed that promoting a culture of quality management and patient safety can help the accreditation program to overcome many of its challenges.^[5] El-Jardali *et al.* showed that Lebanese hospitals have made progress by recognizing patient safety as a major strategic goal and priority.^[8] However, to some extent, the participants in our study considered all stated criteria are important for quality and are implemented in hospitals since all ratings were good.

Interesting that the criterion considered least important was considered also least implemented (i.e., "the

Table 4: Ratings of Joint Commission International criteria implementation by respondents' background; region, hospital type, working in quality unit, and accreditation status

Items	Score out of 5, mean±SD	P
Region		
Taif	4.003±0.197	0.057
Makkah	3.701±1.251	
Jeddah	3.430±1.322	
Hospital type		
Ministry of Health	3.547±1.227	0.074
Military	4.231±0.914	
Private	3.923±0.981	
Hospital accredited by CBAHI		
No	3.333±0.704	0.305
Yes	3.792±1.158	
Hospital accredited by JCI		
No	3.666±1.060	0.486
Yes	3.827±1.192	
Working in quality unit		
No	3.860±1.111	0.301
Yes	3.621±1.171	

CBAHI=Central Board of Accreditation for Healthcare Institution, JCI=Joint Commission International, SD=Standard deviation

effectiveness of the ASP [Antibiotic Stewardship Program] is monitored"). Such a finding might be linked to the fact that CBAHI requirements do not include a criterion related to the stewardship program. Quality and safety departments in the hospitals going into JCI accreditation should be alerted to make efforts in addressing the aspects covered by JCI but absent in CBAHI. The US Centre for Disease Control and Prevention stated that "optimizing the use of antibiotics is critical to effectively treat infections, protect patients from harms caused by unnecessary antibiotic use, and combat antibiotic resistance. ASPs can help clinicians improve clinical outcomes and minimize harms by improving antibiotic prescribing. Hospital ASPs can increase infection cure rates while reducing treatment failures, *Clostridium difficile* infections, adverse effects, antibiotic resistance, and hospital costs and length of stay."^[35] According to Sekimoto *et al.*, hospital accreditation had a significant impact on the infection control infrastructure.^[11] Thornlow and Merwin, reported that rates of infections were less frequent in hospitals accredited by JCI.^[14] Nouwens *et al.*, findings showed that practice accreditation may have positive outcomes on quality of care, but not all planned elements may contribute to its outcomes.^[9]

On the other hand, Warden *et al.* findings showed that pharmacist involvement in medication reconciliation and discharge counseling for heart failure patients was associated with a significant increase in adherence with

the joint commission measures, a significant reduction in 30-day all-cause readmissions, and a positive effect on patient satisfaction.^[20] Medication reconciliation is another important practice aimed at increasing patients' safety. The JCI stated that "The hospital identifies the information needed to reconcile current and newly ordered medications." The criteria also stated, "Initial medication orders are compared to the list of medications taken prior to admission, according to the hospital's established process." Our respondents highly rated the two criteria regarding opinion and practice indicating that the criteria are important and are implemented in their hospitals.

Our study revealed a couple of important findings that can be used to improve the readiness of hospital pharmacies for JCI accreditation. Most hospitals in the Makkah region are accredited to CBAHI, however, being accredited further internationally according to JCI standard would improve patients' safety and enhance the provided pharmaceutical services. Health authorities and hospital administrations in both governmental and private sectors should work to remove barriers and obstacles that may make the implementation of the quality criteria difficult. Barati *et al.* identified a lot of barriers encounter by hospital pharmacies concerning accreditation including those challenging medication management.^[7] Among important challenges and barriers are the lack of clinical pharmacists, defects in pharmacy staff training, lack of adequate access to physicians' prescriptions, and lack of documentation on reports of medication errors.

A limitation of the present study was the small sample size. However, pharmacy personnel can be considered a homogenous sample likely representing the workforce working in the pharmacy departments of the hospitals in Makkah Province. Hopefully, we were able to get some representation from all three types of hospitals (MOH, military, and private). The study was able to reveal a couple of important findings that can be considered as baseline information for further investigations into the topic using a larger sample size. Another limitation that exists in survey-based studies is the possibility of the reporting bias where respondents self-report what they perceive as existing practices. The findings of the study might be considered applicable to the hospitals in western Saudi Arabia but might not be generalized to the other regions of Saudi Arabia. However, it is unlikely that big differences will be existing between western Saudi Arabia and the other regions in terms of the implemented accreditation criteria because of the unified policies and regulations adopted throughout the country including quality and medical practice-related requirements.

Table 5: Awareness about Joint Commission International and Central Board of Accreditation for Healthcare Institution accreditation standards by respondents background; working in quality unit and hospital accreditation status

Items	CBAHI accredited hospital			JCI accredited hospital			Working in quality unit		
	No (n=7), F (%)	Yes (n=94), F (%)	P	No (n=42), F (%)	Yes (n=59), F (%)	P	No (n=59), F (%)	Yes (n=42), F (%)	P
Accreditation cycles for JCI and CBAHI are identical*									
Agree (√)	2 (28.6)	59 (62.8)	0.104	21 (50.0)	40 (67.8)	0.167	33 (55.9)	28 (66.7)	0.009
Disagree	2 (28.6)	21 (22.3)		10 (23.8)	13 (22.0)		10 (16.9)	13 (31.0)	
Do not know	3 (42.9)	11 (11.7)		9 (21.4)	5 (8.5)		13 (22.0)	1 (2.4)	
JCI and CBAHI criteria are identical									
Disagree (√)	0	18 (19.1)	0.108	7 (16.7)	11 (18.6)	0.286	10 (16.9)	8 (19)	0.253
Agree	4 (57.1)	62 (66.0)		25 (59.5)	41 (69.5)		36 (61.0)	30 (71.4)	
Do not know	3 (42.9)	14 (14.9)		10 (23.8)	7 (11.9)		13 (22.0)	4 (9.5)	
JCI criteria are more comprehensive than CBAHI									
Agree (√)	3 (42.9)	50 (53.2)	0.601	20 (47.6)	33 (55.9)	0.072	31 (52.5)	22 (52.4)	0.414
Disagree	1 (14.3)	20 (21.3)		6 (14.3)	15 (25.4)		10 (16.9)	11 (26.2)	
Do not know	3 (42.9)	24 (25.5)		16 (38.1)	11 (18.6)		18 (30.5)	9 (21.4)	
JCI criteria are more concise than CBAHI									
Agree (√)	3 (42.9)	53 (56.4)	0.288	20 (47.6)	36 (61.0)	0.012	31 (52.5)	25 (59.5)	0.007
Disagree	0	12 (12.8)		2 (4.8)	10 (16.9)		3 (5.1)	9 (21.4)	
Do not know	4 (57.1)	29 (30.9)		20 (47.6)	13 (22.0)		25 (42.4)	8 (19.0)	
JCI criteria are clearer than CBAHI									
Agree (√)	2 (28.6)	45 (47.9)	0.427	14 (33.3)	33 (55.9)	0.021	27 (45.8)	20 (47.6)	0.167
Disagree	1 (14.3)	18 (19.1)		7 (16.7)	12 (20.3)		8 (13.6)	11 (26.2)	
Do not know	4 (57.1)	31 (33.0)		21 (50.0)	14 (23.7)		24 (40.7)	11 (26.2)	
JCI criteria are more in number than CBAHI									
Disagree (√)	0	15 (16.0)	0.039	6 (14.3)	9 (15.3)	0.013	9 (15.3)	6 (14.3)	0.111
Agree	2 (28.6)	54 (57.4)		17 (40.5)	39 (66.1)		28 (47.5)	28 (66.7)	
Do not know	5 (71.4)	25 (26.6)		19 (45.2)	11 (18.6)		22 (37.3)	8 (19.0)	

*Responses for this question were missing for 3 participants. √=The correct answer, CBAHI=Central Board of Accreditation for Healthcare Institution, JCI=Joint Commission International

However, it is possible that the pharmacists' awareness and views differ from part to part.

In summary, to a high extent, pharmacists were supportive of JCI criteria and considered most criteria were implemented in their hospitals. There is room for improvement to enhance awareness and support of JCI quality criteria among pharmacists. Comparative analyses indicated relatively higher awareness among those working in quality units and those from CBAHI and JCI-accredited hospitals.

AUTHORS' CONTRIBUTION

All authors contributed significantly to the planning, conduction and the execution of the this study including data collection and analyses, and the paper writing and approval.

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Conflicts of interest

There are no conflicts of interest.

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Supplementary Table 1: Opinions and views

Item	Score, mean±SD
All settings, services, and individuals who manage medication processes are included in the organizational structure	3.75±1.292
A licensed pharmacist or other qualified individual directly supervises the activities of the pharmacy or pharmaceutical service and ensures compliance with applicable laws and regulations	3.72±1.379
The program is based on scientific evidence, accepted practice guidelines, and local laws and regulations	3.61±1.407
The effectiveness of the antibiotic stewardship program is monitored	3.59±1.415
There is a list of medications by both brand name and generic name, stocked in the hospital or readily available from outside sources, and the list is reviewed annually	3.67±1.422
There is a process for obtaining medications during the night or when the pharmacy is closed and for obtaining medications not stocked or not normally available to the hospital	3.65±1.352
Medications are stored under conditions suitable for product stability, including medications stored on individual patient care units and ambulances, as applicable	3.80±1.371
There is a process for managing medications or products requiring special handling such as hazardous medications, radioactive medications, and investigational medications	3.94±1.310
Emergency medications are immediately available in the units where they will be needed or are readily accessible within the hospital to meet emergency needs	3.88±1.373
The hospital establishes and implements a process for how emergency medications are uniformly stored; maintained; replaced when used, damaged, or out of date; and protected from loss or theft	3.83±1.372
The hospital establishes and implements a process for receiving and acting on notifications of medications recalls	3.76±1.358
The process includes identifying, retrieving, and returning, or safely and properly destroying, medications recalled by the manufacturer, supplier, or regulatory agency	3.73±1.392
The hospital identifies the information needed to reconcile current and newly ordered medications	3.69±1.384
Initial medication orders are compared to the list of medications taken prior to admission, according to the hospital's established process	3.79±1.314
Only those permitted by the hospital and by relevant licensure, laws, and regulations prescribe or order medications	3.89±1.370
The hospital establishes and implements a process to place limits, when appropriate, on the prescribing or ordering practices of individuals	3.77±1.333
The hospital develops and implements a process to manage medication orders that are incomplete, illegible, or unclear; including measures to prevent continued occurrence	3.84±1.317
Medications prescribed or ordered are documented in the patient's medical record or inserted into the patient's medical record at discharge or transfer	3.92±1.332
Medications are prepared and dispensed in clean, uncluttered, safe, and functionally separate areas with appropriate medical equipment and supplies	3.84±1.347
Staff preparing/compounding sterile products/medications are trained and competent in the principles of medication preparation and aseptic techniques and are provided resources to support the medication preparation process	3.79±1.337
The hospital defines the patient-specific information required for an effective review process, and the source or availability of this information is available at all times when the pharmacy is open or closed	3.78±1.346
Clinical decision support programs used for the full appropriateness review, as well as other computer programs and print reference materials used to cross-check the critical elements of an appropriateness review, are current and updated	3.74±1.376
Medications are dispensed in the most ready-to-administer form available	3.80±1.342
The system supports accurate and timely dispensing and documentation of dispensing practices	3.71±1.337
The hospital identifies those individuals, by job description or the privileging process, authorized to administer medications	3.79±1.321
Medication administration is recorded for each dose	3.83±1.289
Medications are verified with the prescription or order	3.81±1.354
The dosage amount of the medication is verified with the prescription or order	3.86±1.289
The hospital establishes and implements a process to govern patient self-administration of medications	3.78±1.331
The hospital establishes and implements a process to govern the management, use, and documentation of medication brought in by the patient/family	3.66±1.306
The hospital performs a risk assessment for sample medications brought in by the patient or provided by other sources that addresses where and when the medication was obtained and how the medication was stored prior to arrival	3.63±1.354
The hospital establishes and implements a process to govern the availability, management, use, and documentation of medication samples	3.68±1.356
Medication adverse effects on patients are monitored and documented	3.88±1.267
The hospital utilizes a standardized process for reporting adverse medication effects as part of the hospital quality program	3.77±1.264
The hospital establishes a definition for a medication error and near miss	3.85±1.314
The hospital establishes and implements a process for reporting and acting on medication errors and near misses	3.88±1.329
The hospital identifies in writing its list of high-alert medications	3.87±1.347
The hospital develops and implements a process for reducing the risk and harm of high-alert medications that is uniform throughout the hospital	3.84±1.294

Contd...

Supplementary Table 1: Contd...

Item	Score, mean±SD
The hospital identifies in writing its list of look-alike/sound-alike medications	3.87±1.317
the hospital develops and implements a process for managing look-alike/sound-alike medications that is uniform throughout the hospital	3.82±1.352
Patients and families are provided with a complete list of medications to be taken at home	3.75±1.374
Patients and families are educated about the safe and effective use of all medications, potential side effects, and the prevention of potential interactions with over-the-counter medications and/or food	3.83±1.327
Overall average score	3.7852

SD=Standard deviation

Supplementary Table 2: Practice

Item	Score, mean±SD
All settings, services, and individuals who manage medication processes are included in the organizational structure	3.67±1.258
A licensed pharmacist or other qualified individual directly supervises the activities of the pharmacy or pharmaceutical service and ensures compliance with applicable laws and regulations	3.73±1.272
The program is based on scientific evidence, accepted practice guidelines, and local laws and regulations	3.61±1.356
The effectiveness of the antibiotic stewardship program is monitored	3.50±1.361
There is a list of medications by both brand name and generic name, stocked in the hospital or readily available from outside sources, and the list is reviewed annually	3.60±1.379
There is a process for obtaining medications during the night or when the pharmacy is closed and for obtaining medications not stocked or not normally available to the hospital	3.64±1.293
Medications are stored under conditions suitable for product stability, including medications stored on individual patient care units and ambulances, as applicable	3.87±1.238
There is a process for managing medications or products requiring special handling such as hazardous medications, radioactive medications, and investigational medications	3.82±1.307
Emergency medications are immediately available in the units where they will be needed or are readily accessible within the hospital to meet emergency needs	3.86±1.289
The hospital establishes and implements a process for how emergency medications are uniformly stored; maintained; replaced when used, damaged, or out of date; and protected from loss or theft	3.69±1.286
The hospital establishes and implements a process for receiving and acting on notifications of medications recalls	3.70±1.269
The process includes identifying, retrieving, and returning, or safely and properly destroying, medications recalled by the manufacturer, supplier, or regulatory agency	3.73±1.318
The hospital identifies the information needed to reconcile current and newly ordered medications	3.72±1.242
Initial medication orders are compared to the list of medications taken prior to admission, according to the hospital's established process	3.68±1.319
Only those permitted by the hospital and by relevant licensure, laws, and regulations prescribe or order medications	3.76±1.313
The hospital establishes and implements a process to place limits, when appropriate, on the prescribing or ordering practices of individuals	3.68±1.240
The hospital develops and implements a process to manage medication orders that are incomplete, illegible, or unclear; including measures to prevent continued occurrence	3.76±1.320
Medications prescribed or ordered are documented in the patient's medical record or inserted into the patient's medical record at discharge or transfer	3.79±1.329
Medications are prepared and dispensed in clean, uncluttered, safe, and functionally separate areas with appropriate medical equipment and supplies	3.79±1.291
Staff preparing/compounding sterile products/medications are trained and competent in the principles of medication preparation and aseptic techniques and are provided resources to support the medication preparation process	3.72±1.320
The hospital defines the patient-specific information required for an effective review process, and the source or availability of this information is available at all times when the pharmacy is open or closed	3.73±1.224
Clinical decision support programs used for the full appropriateness review, as well as other computer programs and print reference materials used to cross-check the critical elements of an appropriateness review, are current and updated	3.66±1.259
Medications are dispensed in the most ready-to-administer form available	3.80±1.265
The system supports accurate and timely dispensing and documentation of dispensing practices	3.79±1.395
The hospital identifies those individuals, by job description or the privileging process, authorized to administer medications	3.81±1.247
Medication administration is recorded for each dose	3.79±1.259
Medications are verified with the prescription or order	3.83±1.273
The dosage amount of the medication is verified with the prescription or order	3.77±1.287
The hospital establishes and implements a process to govern patient self-administration of medications	3.75±1.322
The hospital establishes and implements a process to govern the management, use, and documentation of medication brought in by the patient/family	3.64±1.308

Contd...

Supplementary Table 2: Contd...

Item	Score, mean±SD
The hospital performs a risk assessment for sample medications brought in by the patient or provided by other sources that addresses where and when the medication was obtained and how the medication was stored prior to arrival	3.71±1.322
The hospital establishes and implements a process to govern the availability, management, use, and documentation of medication samples	3.69±1.347
Medication adverse effects on patients are monitored and documented	3.77±1.256
The hospital utilizes a standardized process for reporting adverse medication effects as part of the hospital quality program	3.85±1.260
The hospital establishes a definition for a medication error and near miss	3.93±1.227
The hospital establishes and implements a process for reporting and acting on medication errors and near misses	3.85±1.291
The hospital identifies in writing its list of high-alert medications	3.93±1.275
The hospital develops and implements a process for reducing the risk and harm of high-alert medications that is uniform throughout the hospital	3.87±1.262
The hospital identifies in writing its list of look-alike/sound-alike medications	3.90±1.300
the hospital develops and implements a process for managing look-alike/sound-alike medications that is uniform throughout the hospital	3.92±1.270
Patients and families are provided with a complete list of medications to be taken at home	3.77±1.333
Patients and families are educated about the safe and effective use of all medications, potential side effects, and the prevention of potential interactions with over-the-counter medications and/or food	3.77±1.256
Overall average score	3.761±1.13681

SD=Standard deviation