Striving for Performance Excellence: Ten Years' Experience & Impact of Accreditation on Quality, Safety, and Overall Performance in King Saud University Medical City (KSUMC) – A Mixed-Methods Study

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Abstract

Background

The Kingdom of Saudi Arabia (KSA) has undergone a healthcare system transformation to improve healthcare delivery and quality and central to this is the accreditation for healthcare facilities. Hospitals in KSA have relied on international accreditation bodies and are now shifting to national accreditation boards. The objective of this paper is to assess long-term effects of national and international accreditation through measuring staff perception after ten years of participation in multiple accreditation surveys.

Methods

This mixed-methods study was conducted at the King Saud University Medical City. The quantitative tool was adapted from previous studies and was made available in both English and Arabic. Respondents were asked to evaluate their involvement in accreditation and hospital readiness for another accreditation survey using 11 subscales. ANOVA was used to evaluate differences in mean scores based on level of participation in accreditation surveys. A qualitative interview tool was also used to elicit input from key stakeholders, senior leaders, and managers from the university hospitals.

Results

A total of 630 respondents completed the survey. The subscale on Patient Safety scored highest with an average and those measuring Accreditation Impact, Quality Impact and Quality Management closely followed. ANOVA results showed a significantly increasing mean score with increasing involvement of respondents in accreditation with highest scores observed for the first accreditation survey. Linear regression results showed increases in selected outcomes when with increasing subscale scores for patient satisfaction, management and leadership and others. Findings from the qualitative component showed that accreditation supported improved and sustained quality of care. Despite some differences and challenges in implementing both international and national accreditation standards, there were areas of complementarity which supported quality improvement. Respondents also noted improvements in patient outcomes as a result of participation in accreditation.

Conclusion

This study is the first to examine the long-term impact of accreditation over an extended period in KSA. The long-term assessment of accreditation conducted in this study revealed that staff perception about performance was highest during the first cycle and consistently decreased with consequent surveys. The slight and incremental decrease in scale scores reveal that the benefits of accreditation were retained.

Introduction

Interest in quality management has expanded to all sectors over the years due to an increase in the general public's demand for better service delivery [1]. As such, tools and policies which improve the quality-of-service delivery have been implemented in various sectors, including the healthcare sector [2]. One tool that is frequently used in quality management within healthcare institutions and is an internationally recognized evaluation strategy is accreditation [3]. Accreditation is a continuous quality improvement process by which external organizations conduct a quality assessment of healthcare organizations [4].

There is a dearth of evidence regarding the impact of hospital accreditation on the quality of care; however, there are some studies which have examined this strategy for quality improvement [5]. Since the process is used to provide benchmarks and to assess internal as well as external mechanisms, hospital accreditation may lead to an improvement in the accountability, quality, efficiency, and effectiveness of a healthcare institution [6, 7]. It can also be used to promote capacity building, interdisciplinary team effectiveness, and the efficient use of hospital resources which may improve organizational performance [3]. Consequently, fully accredited hospitals have been shown to have lower mortality rates, better respect for patient rights, and increased job satisfaction among healthcare staff [1]. Given these potential positive outcomes, various governments and healthcare institutions use accreditation as one way to maintain or improve healthcare quality standards.

Saudi Arabia has gone through a healthcare system transformation in the past couple of decades with the goal of improving healthcare delivery and quality. Central to this healthcare transformation has been the use of accreditation for healthcare facilities [8]. Early examples of hospital accreditation bodies in the Kingdom of Saudi Arabia (KSA) can be traced back to 1994 when the Saudi Medical Services Organization Standards was established by Saudi Aramco [9]. During this period, private and public hospitals were obliged to meet the standards set by Aramco to be accepted as referral institutions for the company's employees. Approximately seven years later, the council for the development of health services was established in the Makkah region [9]. The council established the Makkah Region Quality Program (MRQP) which consisted of standards that were mandatory for private and public hospitals, in the Makkah region, to meet. The standards that MRQP set were based on JCAHO and the standards the previously defined JCAHO and Aramco accreditation criteria. The MRQP served as the foundation for the Central Board for Accreditation of Healthcare Institutions (CBAHI) that is the current national accreditation body for all healthcare facilities in the country [10]. Prior to the establishment of CBAHI, various private and government hospitals had to rely on international accreditation bodies such as, the Joint Commission International (JCI), Accreditation Canada, and The Australian Council on Healthcare Standards (ACHS) [9]. In 2013, the Ministry of Health in KSA made the national accreditation by CBAHI mandatory for all healthcare facilities in the country, even if they have already received international accreditation[10].

The CBAHI standards were created in collaboration with healthcare quality experts in both the public and private sectors[10] .To comply with international standards, accreditation standards should be certified by the International Society for Quality in Health Care (ISQua)[9] .Few studies have been done to measure

the impact of CBAHI on healthcare facility performance in KSA. A study was done on three CBHAI accredited hospitals to determine the effect of accreditation on length of stay, mortality, and infection[11]. Results showed that accreditation did not impact any of the defined measures[11]. Similarly, a case study showed that CBAHI had no impact on critical care unit outcomes such as, mortality rate, ventilator associated pneumonia rate, and average length of stay[12]. At the hospital management level, another study examined the effect of CBAHI on occupational safety culture in healthcare facilities[13]. The dimensions assessed were related to management commitment, training and awareness, communication, supportive environments, personal priorities and risk appreciation, and work environment[13]. The results were insignificant and showed no improvements between the hospitals that were accredited as compared to those who were not [13]. More studies are needed to examine the effect of CBAHI on different healthcare dimensions.

Objective

The aim of this study is to assess long-term effects of national and international accreditation on continuous quality and patient safety improvement at a university medical city in KSA. Specifically, this study aims to determine areas of improvement, contribute to filling the evidence gap on the long-term effects of accreditation, and share lessons learned on improving healthcare quality and safety through accreditation.

Methods

We used a mixed-methods approach and triangulated quantitative and qualitative methods and drawing on multiple sources of data including semi-structured interviews with key informants.

Inclusion criteria

The respondents were eligible if they have actively participated in at least two accreditation cycles at the organization over the last 10 years. Two categories of respondents were identified. Firstly, the frontline staff who have responded to the cross-sectional self-administered survey. We identified our target for the first category to be 1000 respondents. Secondly, key stakeholders, leaders, managers, and executives who have responded to the semi-structured interviews. These respondents have been selected using purposive sampling of senior managers or directors responsible for strategy and planning, healthcare quality, patient safety, accreditation, and performance management. These interviews have been conducted either as face-to-face interviews or online meetings using the Zoom software as feasible.

Duration of data collection

The data collection was launched in February 2020 till May 2021.

Context

This study was conducted at the King Saud University Medical City (KSUMC) that is a tertiary care academic teaching multi-site center with a capacity of 1160 beds and approximately 9000 employees. It is one of the main referral and reference centers in the country. KSUMC has been accredited and re-accredited for three cycles by Accreditation Canada in 2011, 2014, and 2017 and for two cycles by CBAHI in 2017 and 2020. KSUMC is divided administratively into 10 university hospitals and centers. The two largest university hospitals vary in size and location. The first site has 1060 beds and is a multi-disciplinary facility with more than 20 general and subspecialty free medical services providing primary, secondary care, and tertiary care. It includes a designated outpatient and inpatient facility, advanced surgical services and a fully equipped and staffed laboratory, radiology, and pharmacy services in addition to other support services and a dedicated home healthcare program. The second site, that was the first teaching hospital in KSA, has 100 beds and offers complementary services to the former including mainly ophthalmology and ENT healthcare services.

Quantitative Component

Survey tool

The quantitative tool was adapted from previous studies [14-16]. The survey was made available in both Arabic and English and in paper and online formats using Survey Monkey. The adapted survey tool included 11 subscales: Management and Leadership (M&L), Quality Management (QM), Patient Safety (PS), Monitoring Patient Safety Goals (MPSG), Strategic quality planning (SQP), Human resources utilization planning (HRP), Quality Results (QR), Patient satisfaction (Pt. S), Core Questions (CQ), Accreditation Impact (AI) and Benefits of Accreditation (BoA). Respondents were also asked to evaluate their involvement in accreditation and hospital readiness for another accreditation survey on a scale of 1 to 10. The internal reliability for the scales was high with Cronbach's alpha ranging between 0.779 for Monitoring Patient Safety Goals (MPSG) and 0.959 for Patient Satisfaction. (See table 2)

Demographic questions included gender, age, tenure (at hospital and position), highest educational credentials, and occupational category in addition to respondent participation in accreditation. Some additional open-ended questions were added to the survey request respondent feedback on how to sustain changes resulting from accreditation, challenges they faced in implementing standards (with differentiation between Canadian vs. CBAHI standards), the differences they observed between the two sets of standards, and how accreditation impacted patient outcomes at the hospitals.

Data Analysis

Data were analyzed using IBM SPSS 26.0 and analyses were carried out at the 0.05 significance level. To describe the characteristics of the respondents, univariate statistics were performed. Mean scores were computed for every scale and subscale based on the number of available items. Cronbach's alpha was used to measure internal consistency of the subscales. ANOVA was performed to compare mean scores for each scale and subscale across small-, medium- and large-sized hospitals. The Bonferroni correction was used as a multi-comparison technique. T-test was used to compare subscale scores for each survey

cycle (Canadian accreditation 2011, Canadian accreditation 2014, Canadian accreditation 2017 and CBAHI accreditation in 2017). Principal component factor analysis was conducted with orthogonal rotation (varimax) to create factor scores [17]. Eigen values exceeding 1.0 were considered. One factor score was calculated for each of the scales except for those on Monitoring Patient Safety Goals and Core Questions, each of which yielded two factor scores. As mentioned before, the factor scores representing Quality Results, Accreditation Impact and Benefits of Accreditation were considered dependent variables. Linear regression was used to understand the associations between dependent variables (quality results, accreditation impact, and benefits of accreditation) with remaining subscales represented by their factors scores.

Qualitative tool

A qualitative interview tool was developed targeting key stakeholders, senior leaders and managers from the hospitals who were purposively selected. A total of 15 interviews were conducted. The tool included questions on why accreditation was sought, respondent perception and opinion about the process and features, in addition to the outputs, outcomes and impact of accreditation at the hospitals after particularly after experiencing multiple surveys. The tool also included questions about key challenges and lessons learned in addition to the way forward.

The five stage 'framework approach' was employed for data analysis[18, 19]: Familiarization, identification of thematic framework, indexing of the transcripts, abstraction and synthesis through charting and conceptual mapping and interpretation. The thematic framework was defined by the original research questions and objectives of the study, review of relevant literature, and issues arising from preliminary interviews, plus additional themes of relevance that emerged from the data during the familiarization process.

Results

Quantitative Results

At the time of the study, the total number of staff at the hospital was 5695. A target sample size of 20% of the hospital staff was set which amounts to a total of 1139. A total of 630 respondents completed the survey which reflects a total response rate of 55.3%. As detailed in Table 1 below, the majority of respondents were females (67.6%), and most were aged between 30 and 45 (64.1%). Respondents had an average tenure of 10.98 years (SD=7.23) at the hospital and 8.98 years (SD=6.29) in their current position. Most respondents held a bachelor's degree (45.2%) and 46.8% were nurses. A total of 83.8% of respondents participated in at least two accreditation cycles. The average response for respondent involvement in the accreditation process was 5.51 (SD=1.48). However, respondents reported an average score of 7.63 (SD=2.01) in terms of hospital readiness for the next accreditation cycle.

Only 37.1% of respondents participated in the Accreditation Canada 2011 cycle, while 53% participated in the Accreditation Canada 2014 cycle and 69.7% participated in that of 2017. A total of 72.7% of

respondents participated in the 2017 accreditation cycle for CBAHI. As detailed in Table 2,

Mean scores for subscales revealed that respondents generally agreed with survey items. The subscale on Patient Safety scored highest with an average of 4.17 (SD=0.65). The subscales on Accreditation Impact, Quality Impact and Quality Management closely followed with similar average scores which demonstrated agreement with subscale items. The lowest scoring item was that including Core Questions with an average of 3.79 (SD=0.53).

Interesting observations were found when exploring results for individual items. The majority of respondents (80.4%) indicated that senior executives provide highly visible leadership in maintaining an environment that supports quality improvement and 82.7% indicated that top management is the driving force behind quality improvement efforts and allocate resources for these efforts (75.1%). Responses also indicated that senior executives consistently participate in activities to improve the quality of care and services (80.9%) and have demonstrated an ability to manage the changes needed to improve the quality of care and services (81.1%). According to respondents, senior executives generate confidence that efforts to improve quality will succeed (80.7%), have articulated a clear vision for improving the quality of care and services (83.7%) and have a thorough understanding of how to improve the quality of care and services (83.5%). Moreover, respondents believe that there is critical analysis of the quality management system conducted regularly by senior management (79.0%).

Respondents agreed that the hospital has policies to support quality improvement and programs of care related to accreditation (85.7%) and that the hospital incorporates quality concepts into new services (85.5%). Moreover, the new services are assessed for quality prior to implementation (77.5%) and the hospital maintains records of quality problems they encounter during implementation (87.2%). The hospital also has clearly defined indicators for accreditation (86.1%) and quality objectives that are regularly measured and evaluated (82.6%).

Demonstrated changes were noted as a result of reporting adverse events over the years (85.1%) and hazards and risks are continuously identified and managed in respondents' departments (85.7%). The hospital also offers staff patient safety training on a regular basis (89.7%) and includes continuing medical education as a component of annual performance appraisal (87%). Respondents also believed that their policies and procedures are effective in preventing errors (90.1%); patient safety is not sacrificed to get more work done (82.2%) and changes are always evaluated for effectiveness (87.5%). The majority of respondents also specified participating in conducting tracers to monitor patient safety goals (73.9%). The hospital provides a climate that supports patient safety (86.6%) and actions of upper management demonstrate that patient safety is a top priority (87.1%).

Respondents indicated that there has been an increase in reporting adverse events (61%) and near misses (57%) over the past few years. The majority believed that the reporting of such events has allowed reviewing procedures to prevent new events with the same cause (85.7%) and reduce their severity (85.4%). Moreover, required organizational practices are regularly monitored for compliance (86.3%).

The overwhelming majority of respondents indicated that the accreditation program is part of the hospital's strategic plan (92.1%). Respondents also indicated that staff are given enough time to plan and test for quality improvement (76.3%) and that each department maintains specific goals to improve quality and meet accreditation standards (89.4%). The majority of staff indicated that the hospitals' quality improvement goals are known throughout the unit (84.3%), and they play a key role in setting priorities for quality improvement (86.7%). Respondents indicated that middle managers are as equally involved as staff in developing plans for quality improvement (77.4%) and that they play a key role in setting priorities for quality improvement (85.3%).

Respondents indicated that staff are given education and training on how to identify and act on quality improvement opportunities based on accreditation recommendations (81.8%). Staff are also given continuous training in methods to improve quality management (81.1%) and skills and performance (81%). Only half of the respondents also indicated that staff are offered rewards for quality improvement (50.8%) and 53.4% indicated that they are commended when tasks are done according to policies and procedures. However, 75.4% indicated that inter-departmental cooperation is supported and encouraged. Respondents indicated that the hospital has an effective system for staff to make suggestions to improve quality (69.1%) and that they are given feedback on the changes made based on their suggestions (63.4%) and event reports (67.6%).

When it came to quality results, respondents indicated that the hospital has shown steady, measurable improvement in the quality of services (72.6%), quality of care in different departments and services (83.1%), and quality of services such as laboratory, pharmacy, and radiology (80.7%). The hospital has also maintained a high quality of health services despite financial constraints (76.6%) which they have been measuring through key performance indicators (87.3%) and documented through improvement in patient outcomes (84.6%).

In terms of patient satisfaction, the hospital has shown steady and measurable improvement in that regard (82%) and does a good job in assessing current (83.2%) and future patient needs and expectations (79.3%). Respondents indicated that patient complaints are swiftly met (81.9%), analyzed to prevent the same problem from recurring (82.1%). The hospital also has a formal process for patients to communicate their questions and concerns (76.6%) and uses data from patients to improve services (82.8%). The hospital also regularly assesses patient satisfaction (83.4%) and uses this data when designing new services (75.9%).

When it came to the core questions, around two-thirds of respondents reported stark improvements in requirements and standards between CEBAHI and Accreditation Canada (63%). The majority agreed that the hospital has been working to sustain gains and improvements after accreditation (88.2%). Staff were generally welcoming of the decision to engaged in both local and international accreditation (76.9%) and found it easy to conduct (60.4%). Respondents found it easy to integrate participation in accreditation with general duties (62.7%) and were able to voice their concerns about challenges and difficulties experienced (59.9%). Staff were provided with skills and training when it came to implementing new

tasks (81%). Moreover, the hospital has created a quality system that supports implementing changes based on accreditation recommendations (84%) which made the most recent cycles were easier to implement compared to earlier ones (70%). Respondents believed that changes made as a result of accreditation are sustainable (79.9%) and that accreditation is not seen as a one-off activity (77.8%). Although 80.3% of respondents believed that Accreditation Canada standards were feasible to implement while 70.7% reported the same for CEBAHI. Moreover, a total of 87.6% of respondents believed that Accreditation Canada approach and methods of surveying were engaging and sustainable while 78.8% reported the same for CEBAHI.

Respondents indicated that important changes are made in preparation for accreditation (90.8%) and indicated having participated in implementing these changes (85.2%). Recommendations from the last accreditation survey were communicated to staff after the last survey (84%) and were an opportunity to implement important changes at the hospital (86.6%).

As for accreditation benefits, respondents indicated that it has enabled improvement of patient care (86.6%) and motivated staff at the hospital (78.2%). Moreover, respondents indicated that accreditation enabled the development of shared values (80.9%) at the hospital and enabled it to be more perceptive to changes (81.2%). It also enabled the hospital to better use its resources (74.9%), respondent to population needs (79.8%) and partners' needs (74.6%).

ANOVA results showed a significantly increasing mean score with increasing involvement of respondents in accreditation. This was significant for subscales on Management and Leadership, Quality Management, Patient Safety, Strategic Quality Planning, Quality Results, and Accreditation Impact (Table 3).

No significant difference was observed for respondent involvement in cycles 1 vs. 2. However, it should be noted that the difference was observed for involvement in cycle 1 vs. 4 for the subscales on Management and Leadership (M&L), Quality Management (QM), Patient Safety (PS), Strategic quality planning (SQP) and Accreditation Impact (AI). Significance different was observed for involvement in cycle 2 vs. cycle 4 for subscales on Management and Leadership (M&L), Quality Management (QM), Patient Safety (PS), Strategic quality planning (SQP), and Quality Results (QR). The significant difference was observed between cycles 1 and 3 for the subscale on Quality Management (QM) (Table 3).

ANOVA was constructed to discern difference in response based on which accreditation survey they participated in (See Table 4). It was interesting to observe no significant difference between responses for participation in Canadian vs. CBAHI accreditation. However, a significant difference was observed between participation in Canadian accreditation vs. participation in both types of accreditation surveys with the mean score of the latter being significantly higher. This was observed for the subscales on Management and Leadership (M&L), Quality Management (QM), Patient Safety (PS), Monitoring Patient Safety Goals (MPSG), Strategic quality planning (SQP) and Accreditation Impact (AI).

As detailed in Table 5 below, an analysis of the average subscale score were highest during the Accreditation Canada 2011 survey and started to slowly decrease with subsequent surveys. This was not observed for the subscales on human resource utilization, quality results, patient satisfaction, core questions and benefits of accreditation.

Regression Results

Linear mixed regression results detailed in Table 6 showed an increase of 0.133 (p-value = 0.025) for quality results for every one-unit increase in the subscale on management and leadership. Similarly, an increase of 0.195 (p-value = 0.002) was observed for quality results for everyone unit increase in patient satisfaction. A one-unit increase in the first factor for core questions and benefits of accreditation resulted in respective increases of 0.254 (p-value = 0.001) and 0.177 (p-value =0.001) in quality results.

An increase of 0.163 (p-value =0.028) was observed in accreditation impact for every one-unit increase in management and leadership. A one-unit increase in both factors for Monitoring Patient Safety Goals resulted in respective increases of 0.203 (p-value = 0.009) and 0.100 (p-value =0.014) in Accreditation Impact. An increase of 0.371 (p-value <0.001) in accreditation results was also observed for every unit increase in benefits of accreditation.

A one-unit increase in management and leadership and the second factor on Monitoring Patient Safety Goals resulted in decrease of 0.182 (p-value = 0.015) and 0.088 (p-value = 0.023) respectively in benefits of accreditation. An increase of 0.224 (p-value = 0.003) and 0.248 (p-value =0.001) was observed for benefits of accreditation for every one-unit increase in human resource utilization and quality results respectively. Finally, a one-unit increase in each of the first factor for core questions and accreditation impact resulted in an increase of 0.215 (p-value = 0.014) and 0.331 (p-value <0.001) in benefits of accreditation.

Qualitative Results

Results from the qualitative component reflected on responses on questions focusing on ways in which changes, and improvements can be sustained, challenges in implementing Accreditation Canada standards and implementing CBAHI standards, differences implementation of Accreditation Canada standards requirements and CBAHI standards, and ways with which accreditation impacted patient outcomes at KSUMC.

- *Ways in which changes, and improvements gained after the last accreditation survey be sustained*

Most respondents agreed that accreditation provided an opportunity to improve and sustain quality. One respondent indicated that accreditation does improve quality but does not sustain it due to the regression of quality practices after accreditation is achieved. In order to sustain the gains and scale up the improvements achieved so far; several suggestions were proposed. The most recurrent suggestion was building accountability for quality in all hospital employees followed by maintaining, monitoring,

evaluating, and improving practices, the establishment of departmental KPI dashboard and empowering departmental quality teams. Leadership commitment, encouragement and support to the quality department were also suggested as a method of sustaining quality. Performing annual mock accreditations and frequent national and international accreditation cycles were less frequent yet significant suggestions made by several respondents. They also recommended recruiting healthcare professionals, integrating more IT services, and increasing documentation. Transparency in the departmental assessment results and developing reward systems for outstanding departments were other key factors in maintaining the achieved gains since they create motivation, friendly competition and enhance knowledge sharing. One respondent also suggested, supporting staff through offering them training and continuing medical education and conducting quality improvement initiatives to improve compliance with the policies and procedures.

While one respondent reported no barriers to sustainability, others mentioned barriers such as staff resistance, the nature of the relationship between the hospital and the university and institutional struggles, such as financial issues and pandemics.

When asked what needs to be done for future accreditation cycles the responses collected identified several different gaps that need to be addressed. The most common response was to sustain the implementation of quality standards, maintain the gains of previous accreditation cycles and guarantee patient safety. Another issue identified by a respondent was the need for longer preparatory phases for each accreditation cycle which would help build up the culture of quality. A need for a more specialized accreditation and to continuously seek alternate accreditations and certification were also suggested by other respondents. Lastly, one respondent mentioned that future accreditations should be modified to ensure the integration of quality in daily hospital practices and strengthen of the culture of quality across the hospital.

When questioned on their performance expectation in upcoming accreditation cycles, all except one respondent believed they would do well due to their experience from previous cycles. Nonetheless, these respondents voiced concern about different issues that need to be addressed. These included finding sources of continuous funding, enhancement of documentation, implementation of standards, the interpretation of policies and procedures, engaging new generations to compensate for the employee turnover rate, and the improvement of the standards and practices of the administration and the human resources office. Additionally, one respondent stated that more attention needs to be given to the patient satisfaction and mental well-being by decreasing the number of beds per room and improving the overall patient experiences through establishing coffee corners and green spaces in and around the hospital. One respondent was pessimistic about future accreditation surveys due to poor compliance with standards between each cycle and stated that pitfalls need to be better addressed to achieve better future results.

- *Challenges in implementing Accreditation Canada standards*

The main challenge voiced by respondents in implementing international accreditation standards related to limited integration into the regular quality improvement activities taking place. One respondent indicated that such integration was more successful in some departments than in others. Another one of the interviewees mentioned that the institution benefited from the comments and recommendations of the accreditation inspectors and checked how other institutions successfully integrated the accreditation requirements in their routine practices and incorporated them in their own institution. Accreditation resulted in the improvement of quality standards and continuous monitoring of quality outcomes, the modification of the managerial practices, the integration of quality practices into the daily practices and operations, and the communication of quality findings through the quality department. It also resulted in a more quality and patient-oriented hospital management.

- *Challenges in implementing CBAHI standards*

Regarding the national accreditation, two respondents observed no integration of the international accreditation preparation into the regular quality improvement activities, reported no integration of the national preparation in daily quality activities. However, most respondents did observe such an integration, where many stated that integration was higher with CBAHI than the Canadian accreditation due to the mandatory and systematic nature of CBAHI, and the precise checklists and recommendations it provides. Respondents reported improvement in quality improvement activities, better alignment of daily practices with accreditation requirements and KPIs, better documentation and more professional staff who became more quality-oriented and stopped differentiating between CBAHI and Canadian accreditation. Only one respondent indicated that the integration of the requirements in departments with limited turnaround time was harder due to the similar demanding and time-restricting nature of the CBAHI accreditation.

- *Main differences in implementation of international accreditation standards vs. national accreditation standards*

With respect to hesitation towards the national accreditation in specific, a debate emerged on the necessity and benefits of obtaining both the national and international accreditations. However, most of the respondents recognized CBAHI as the official national accreditation system. Other respondents realized the impact and benefits of CBAHI which encouraged them to work towards it despite its difficulty and preparation time required. One respondent mentioned that their previous experience with the Canadian accreditation eliminated resistance once the CBAHI accreditation came up. Nonetheless, some mentioned that CBAHI was challenging, and its standards were difficult to fulfill. Some of those challenges included conducting quality improvement initiatives and staff compliance with the hospital safety protocols and procedures and the need to provide them with continuing medical education trainings, in addition to limited financial resources. One respondent indicated that some staff were intimidated with potential layoff as a way of imposing CBAHI accreditation.

When asked about managing CBAHI and the Canadian accreditations during the same year, several benefits and drawbacks were obtained from the interviews. Despite accreditation being challenging and

adding to staff workload, especially the clinical services and quality department, almost all respondents would overlap both accreditations again and found that to be more efficient and timesaving and as such, accreditation requirements can be aligned and implemented simultaneously. One respondent even mentioned that it is better to overlap the two cycles every other year. The workload was believed to get easier with time as the employees became familiar with the accreditation requirements and processes. It also gives more time to address the pitfalls between the cycles and allows the hospital to be better prepared for the next cycle. A less common but important reason was that it allows CBAHI to revise the gaps that the Canadian accreditation did not address, since national accreditation is more context specific. One respondent mentioned that undertaking both accreditation surveys simultaneously allow the hospital to be ahead of other institutions and thus have a better reputation.

In contrast to the above, two interviewees preferred separating the two accreditation cycles. The first found aligning the requirements difficult claiming that they were different and preferred not to overlap the two cycles in the future. The second interviewee preferred focusing on the national accreditation first assuming that it is the one to promote the healthcare facility among others in KSA. One respondent was against having the CBAHI accreditation altogether.

- *Ways with which accreditation impacted patient outcomes at KSUMC*

There were three kinds of responses when asked about the resulting improvement in patient outcomes. The most common opinion was that patient outcomes improved in terms of assessment and evaluation, patient safety, satisfaction and awareness, better patient flow, standardization of medical practice protocols, infection rates, waiting time, cancelation rates, bed occupancy rates, prophylaxis rates, efficient utilization of facilities and more quality improvement initiatives. Another less common opinion was that that although outcomes did improve there was no measurable data. This can only be changed when staff become more patient-oriented rather than focused on documentation. The last group reported no change in outcomes before and after accreditation. This, however, may not be completely accurate and may be the result of lack of outcome recording, monitoring, and followed up caused by limited number of staff.

Discussion

This study is the first to examine the long-term impact of accreditation over an extended period in KSA. Results spanned staff perception after ten years of participation in multiple accreditation surveys, both national and international. Study findings can inform future directions on accreditation in terms of benefits, impact on quality, strategic planning, and other areas that hospital management can use to create lasting change and tangible improvements. Accreditation is a key component to continuous quality improvement and improving patient outcomes. Accredited hospitals have been shown to outperform non-accredited hospitals and have better overall performance[6]. Participation in accreditation demonstrates organizational commitment to quality improvement and that is a powerful message in today’s dynamic health care environment[20].

Result showed consistently improving scores on study composites. Average subscale scores were highest during the Accreditation Canada 2011 survey and started to slowly decrease with subsequent surveys. This finding reflects the high level of both managerial and staff commitment when accreditation was a new concept. However, as the novelty of accreditation wore off, staff became more confident, the system became more receptive to accreditation requirements and administrative enthusiasm dwindled. Such a finding is not surprising as studies have documented high performance as hospitals gear up for accreditation. Once hospitals obtain accreditation and the surveyors have left, a sharp decline in performance and a plateau in scores is observed. However, the residual benefit from accreditation remains at up to 90% of performance compared to baseline[5]. It should also be noted that respondents who participated in both national and international accreditation surveys had significantly higher scores on survey composites. This reflects on the experiences and lessons gained through repeated exposures to accreditation.

Findings from the survey component reflected varying degrees of agreement on the 11 subscales. Average scores ranged from 3.68 to 4.06 and while they were not low, they do not indicate high agreement with statements. The scale on human resources utilization and planning had the lowest score across the survey composites. It has been documented in the literature that staff participation in accreditation promotes better clinical outcomes and improves organizational processes[5, 21]. As such, it is imperative to incentivize and motivate staff to ensure their buy in and commitment to accreditation. The qualitative component of the study revealed staff resistance to accreditation as it required them to conduct activities above and beyond their regular work duties. Despite the fact that the hospital was able to secure accreditation from both national and international sources, lasting improvement resulting from accreditation is contingent on staff commitment, engagement and support throughout the process. In fact, evidence shows that some of the barriers to accreditation include lack of staff motivation, low salaries and poor incentives, high workload and staff shortages[22]. Overcoming such barriers require commitment from hospital top management to provide intrinsic and extrinsic motivation measures as the rewards will be reaped in better quality of services, hospital performance, productivity and patient outcomes[22, 23]. Staff resistance is believed to be one of the biggest hindrances to implementing accreditation[24], and as such, structural interventions at the organizational level may be needed to create lasting improvements in staff attitudes and behaviors[2].

The issue of human resources utilization is closely linked to management and leadership. While this scale had a higher score than others, it is worth noting that supportive management and visible leadership are critical quality outcomes. This was demonstrated in regression findings where this scale was significantly associated with better quality results, accreditation impact and benefits of accreditation. Moreover, the qualitative component showed that middle managers and leaders were visibly engaged in the accreditation process. Organizational changes that result from accreditation may contribute to greater managerial autonomy which have been linked to improvement in quality and patient outcomes. Managerial support can improve staff involvement in accreditation and evidence shows that managerial commitment can facilitate organizational change and successful implementation of initiatives such as accreditation[16, 25].

Hospital accreditation should be part of a broader organizational strategy that is well planned, consistent and outcome oriented. Such strategies should promote professional development and organizational learning and work on sustainable quality improvement efforts[3]. Organizational learning is not limited to upper management and leaders, it extends to all members of an organization and its success is contingent on open communication and a commitment to team learning[3].

Regular assessments of patient safety cultures are central to quality improvement in hospitals and often an integral component of accreditation requirements[25, 26]. Results from the current study showed that the average score on that composite consistently and significantly decreased since the first accreditation cycle in 2011. It is of note that scores on this composite were significantly higher for respondents who underwent both national and international accreditation and were also higher for respondents who participated in all survey cycles. Despite this finding, greater investments are needed in strengthening patient safety culture in the hospital as it is crucial for improving overall performance and quality of services[26, 27].

Findings from the qualitative component of the survey consistently focused on the mandatory nature of the CBAHI accreditation and the differences between it and the Canadian accreditation. Respondents indicated that CBAHI is more focused on the context of KSA and that the standards are through and at times even more demanding than Canadian accreditation. The fact that CBAHI was mandatory was consistently cited as the main reason for undertaking the process. A review of relevant literature on CBAHI revealed that the standards have a solid focus on quality improvement and patients, they also emphasize the importance of planning and cover important aspects of safety. However, the standards were reportedly believed not to be clearly linked to the health system, lack explicit standards to coordinate risk management activities and did not sufficiently involve patients and the community. The standards also lacked measurable element. A comparison to ISQua revealed that the majority of CBAHI standards did not meet or only partially met ISQua principles[9]. Respondents believed that the fact that the hospital started with Canadian accreditation before undertaking national accreditation enabled it to be better to meet its requirements. However, it also appears that the Canadian accreditation filled some gaps that are not addressed by national accreditation which explain some of the strengths identified in study results.

Study strengths and weakness should be acknowledged. While this is the first study to assess the impact of accreditation after several surveys, it utilized a unique survey that built upon previous tools[16] that assessed similar concepts. To test the validity of the tool, the authors used Cronbach's alpha which revealed high scores for all composites. In addition, confirmatory factor analysis showed that all composites loaded on one factor except for those on Monitoring Patient Safety Goals and Core Questions, each of which yielded two factor scores. Another student limitation is a sample size of 630 respondents. However, the majority of respondents participated in two accreditation cycles (83.8%) and the average tenure at the hospital was approximately 10 years. Moreover, although 37% participated in the 2011 accreditation survey, more than half the respondents participated in cycles from 2014 and on. This comes to show the sampled respondents could confidently report on the overall accreditation experience.

Conclusion And Implications

The long-term assessment of accreditation conducted in this study revealed that staff perception about performance was highest during the first cycle and consistently decreased with consequent surveys. The slight and incremental decrease in scale scores reveal that the benefits of accreditation were retained. The qualitative component confirms hospital and staff commitment to accreditation regardless of the accrediting body and the mandatory nature of one over the other. The ultimate goal of accreditation was to improve processes that govern and affect quality of care and patient outcomes. It is also imperative to acknowledge that the earlier accreditation cycles enabled the organization to adapt to the requirements of the national accrediting body despite the vast differences in standards as cited by research evidence and study respondents.

Declarations

Author contributions

All authors have made substantial contributions and gave final approval of the conceptions, drafting, and final version of this manuscript. MMB, AMA and FE conceptualized and designed the study. FE drafted the outline and FE, and DJ supported the first draft of the manuscript. MAT, YSA, MMB, AMA, FE, and DJ contributed to methodology, survey development, data analysis, interpretation, and write-up.

FE, MMB, and YSA supervised the procedures in the study and reviewed the drafts and final version of this manuscript. All authors have seen and approved the final version of the manuscript.

Ethical considerations

The study protocol was approved by the Institutional Review Board (IRB) of the College of Medicine, King Saud University (No. E-19-4096), Riyadh, KSA. All methods were carried out in accordance with relevant guidelines and regulations. Informed consent was obtained from all subjects.

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Competing Interests

Not Applicable

Conflict of interests

The authors declare no conflict of interests

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Data Availability Statement

All data are incorporated into the article and its online supplementary material.

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Tables

Table 1
Demographic information of respondents

Sociodemographic and professional characteristics	N	%
Gender		
Male	122	32.4
Female	254	67.6
Age		
Below 30 years	23	6.1
Between 30 and 45 years	241	64.1
Between 46 and 55 years	78	20.7
Over 55 years	34	9
Tenure at hospital		
Mean (SD)	10.98 (7.23)	
Tenure in position		
Mean (SD)	8.98 (6.29)	
Highest educational credential		
Under high school	1	0.3
High school degree	4	1.1
Diploma	106	28.2
Bachelor's degree	170	45.2
Master's Degree	33	8.8
Doctorate degree	33	8.8
MD	20	5.3
Other	9	2.4
Occupation		
Physician	73	19.4
Nurse	176	46.8
Midwife	1	0.3
Pharmacist	14	3.7

Sociodemographic and professional characteristics	N	%
Healthcare assistant	5	1.3
Dentist	2	0.5
Administrative	6	1.6
Student/ Trainee	3	0.8
Allied health services (ex. social worker, psychologist, physical therapist, respiratory therapist, dental assistant, et	30	8
Technician or Technologist (e.g., Laboratory, CSSD, radiology, anesthesia technician/ technologist, etc.)	21	5.6
Support services (e.g., Kitchen, laundry, maintenance, security, etc.)	28	7.4
Other	17	4.5
Participated in at least two accreditation cycles		
Yes	471	83.8
No	91	16.2
How do you judge your involvement in the activities and programs related to the accreditation process on a scale from 1 to 10		
Mean (SD)	5.51 (1.48)	
On a scale of 1 to 10, how ready is KSUMC for an upcoming accreditation cycle (1 low, 10 high)		
Mean (SD)	7.63 (2.01)	
Participation in accreditation cycles		
Accreditation Canada 2011	234	37.1
Accreditation Canada 2014	334	53.0
Accreditation Canada 2017	439	69.7
CBAHI 2017	458	72.7

Table 2
Detailed responses per subscales including means, standard deviations, and Cronbach's alpha

Survey Question	Strongly disagree/ Disagree	Neither disagree nor agree	Agree/ Strongly Agree
	N (%)	N (%)	N (%)
Management and Leadership (M&L)			
Senior executives provide highly visible leadership in maintaining an environment that supports quality improvement.	48 (9.3%)	53 (10.3%)	414 (80.4%)
The top management is a primary driving force behind quality improvement efforts.	42 (8.2%)	47 (9.1%)	426 (82.7%)
Senior executives allocate available resources (e.g., finances, people, time, and equipment) to improving quality.	52 (10.2%)	74 (14.6%)	381 (75.1%)
Senior executives consistently participate in activities to improve the quality of care and services	34 (6.6%)	64 (12.5%)	416 (80.9%)
Senior executives have articulated a clear vision for improving the quality of care and services.	29 (5.7%)	54 (10.6%)	428 (83.7%)
Senior executives have demonstrated an ability to manage the changes (e.g., organizational, technological) needed to improve the quality of care and services.	36 (7%)	61 (11.9%)	416 (81.1%)
Based on the accreditation results, senior executives have a thorough understanding of how to improve the quality of care and services.	32 (6.3%)	52 (10.2%)	425 (83.5%)
There is critical analysis of the quality management system conducted regularly by senior management	36 (7.4%)	66 (13.6%)	383 (79%)
The senior executives generate confidence that efforts to improve quality will succeed.	31 (6.1%)	67 (13.2%)	410 (80.7%)
Mean (SD)	**3.95 (0.78)**		
Cronbach's Alpha	**0.946**		
Quality Management (QM)			
There are effective policies to support quality improvement and programs of care that relate to accreditation requirements	25 (5.1%)	45 (9.2%)	420 (85.7%)
We incorporate quality concepts into new services being developed/planned as part of accreditation requirements	18 (3.7%)	52 (10.8%)	413 (85.5%)
The services we provide are thoroughly assessed for quality before implementation	39 (8.1%)	70 (14.5%)	374 (77.5%)
We keep records of quality problems through documentation	22 (4.6%)	40 (8.3%)	421 (87.2%)

Survey Question	Strongly disagree/ Disagree	Neither disagree nor agree	Agree/ Strongly Agree
There are clearly defined indicators dedicated for accreditation standards which are regularly measured and evaluated	25 (5.1%)	43 (8.8%)	423 (86.1%)
Quality objectives (other than accreditation) are regularly measured and evaluated	31 (6.4%)	53 (11%)	400 (82.6%)
Mean (SD)	**4.05 (0.72)**		
Cronbach's Alpha	**0.928**		
Patient Safety (PS)			
Over the last few years, there has been a demonstrated positive change as a result of reporting of adverse events and near misses	24 (5.1%)	46 (9.7%)	402 (85.1%)
Hazards and risks are continuously identified and managed in my department	26 (5.3%)	43 (8.9%)	416 (85.7%)
KSUMC offers patient safety training to all staff on a regular basis	25 (5.2%)	25 (5.1%)	437 (89.7%)
Continuing medical education and training is a component of the annual performance appraisal of staff	31 (6.4%)	32 (6.6%)	421 (87%)
We have policies and procedure systems that are effective in preventing errors	22 (4.6%)	26 (5.4%)	433 (90.1%)
We never sacrifice patient safety to get more work done	38 (7.9%)	48 (9.9%)	397 (82.2%)
We evaluate the effectiveness of changes made to improve patient safety	20 (4.2%)	40 (8.4%)	417 (87.5%)
KSUMC provides a climate that is supportive of patient safety	22 (4.5%)	43 (8.8%)	422 (86.6%)
Actions of upper management clearly show that patient safety is a top priority	21 (4.4%)	41 (8.5%)	419 (87.1%)
Over the last five years, I participated in conducting tracers to monitor patient safety goals	40 (8.5%)	83 (17.6%)	348 (73.9%)
Mean (SD)	**3.94 (0.68)**		
Cronbach's Alpha	**0.959**		
Monitoring Patient Safety Goals (MPSG)			
Over the last few years, there has been an increase in adverse event reports.	78 (18.3%)	88 (20.7%)	260 (61%)

Survey Question	Strongly disagree/ Disagree	Neither disagree nor agree	Agree/ Strongly Agree
Over the last few years, there has been an increase in reporting of near misses.	85 (20.8%)	91 (22.2%)	234 (57%)
Required organizational practices (ROPs) are regularly monitored for compliance in KSUMC	18 (3.9%)	45 (9.8%)	397 (86.3%)
The reporting of adverse events and near misses has allowed reviewing the procedures to reduce the probability of new events with the same cause.	13 (2.9%)	52 (11.4%)	391 (85.7%)
The reporting of adverse events and near misses has allowed reviewing the procedures to reduce the severity (impact for the patient) of potential future events.	13 (2.8%)	54 (11.8%)	392 (85.4%)
Mean (SD)	**3.84 (0.63)**		
Cronbach's Alpha	**0.779**		
Strategic quality planning (SQP)			
The accreditation program is part of the KSUMC strategic plan	17 (3.6%)	20 (4.3%)	429 (92.1%)
KSUMC staff are given adequate time to plan for and test quality improvements.	47 (10.2%)	62 (13.5%)	351 (76.3%)
Each department and work group within KSUMC maintains specific goals to improve quality and meet accreditation standards	15 (3.2%)	34 (7.4%)	412 (89.4%)
KSUMC's quality improvement goals are known throughout all hospital unit	24 (5.2%)	48 (10.4%)	389 (84.3%)
KSUMC middle managers and staff are equally involved in developing plans for improving quality	45 (9.7%)	60 (12.9%)	359 (77.4%)
Middle managers play a key role in setting priorities for quality improvement	24 (5.3%)	55 (12.2%)	373 (82.5%)
Patients' expectations about quality play a key role in setting priorities for quality improvement	23 (5.1%)	44 (9.7%)	386 (85.3%)
KSUMC employees play a key role in setting priorities for quality improvement through representation in hospitals' committees	19 (4.2%)	42 (9.2%)	398 (86.7%)
Mean (SD)	**4.05 (0.66)**		
Cronbach's Alpha	**0.924**		
Human resources utilization planning (HRP)			

Survey Question	Strongly disagree/ Disagree	Neither disagree nor agree	Agree/ Strongly Agree
Staff are given education and training in how to identify and act on quality improvement opportunities based on recommendations from accreditation surveys	34 (7.5%)	49 (10.8%)	372 (81.8%)
Staff are given continuous education and training in methods that support quality improvement.	40 (8.7%)	47 (10.2%)	373 (81.1%)
Staff are given the needed education and training to improve job skills and performance.	35 (7.6%)	52 (11.3%)	372 (81%)
Staff are rewarded and recognized (e.g., financially and/or otherwise) for improving quality.	130 (30%)	83 (19.2%)	220 (50.8%)
Inter-departmental cooperation is supported and encouraged to conduct activities relating to accreditation requirements.	54 (12.2%)	56 (12.6%)	336 (75.4%)
KSUMC has an effective system for staff to make suggestions to management on how to improve quality.	60 (13.7%)	76 (17.3%)	304 (69.1%)
KSUMC staff are given feedback about changes made based on their suggestions	75 (17.3%)	84 (19.4%)	275 (63.4%)
KSUMC staff are given feedback about changes made based on event reports	64 (14.5%)	80 (18%)	300 (67.6%)
KSUMC staff are commended/rewarded when critical tasks are done according to policies and procedures/standards	107 (25.8%)	87 (20.9%)	222 (53.4%)
Mean (SD)	**3.68 (0.87)**		
Cronbach's Alpha	**0.943**		
Quality Results (QR)			
Over the last few years, KSUMC has shown steady, measurable improvements in the quality of services provided by the administration (finance, human resources, etc.)	46 (10.4%)	76 (17.1%)	322 (72.6%)
Over the last few years, KSUMC has shown steady, measurable improvements in the quality of care provided to patients across different departments and services	23 (5.1%)	53 (11.8%)	374 (83.1%)
Over the last few years, KSUMC has shown steady, measurable improvements in the quality of services provided by clinical departments such as laboratory, pharmacy, and radiology.	25 (5.6%)	62 (13.7%)	364 (80.7%)
Over the last few years, KSUMC has maintained a high-quality health services despite financial constraints	29 (6.6%)	73 (16.7%)	335 (76.6%)
Over last few years, KSUMC has been measuring key performance indicators related to specific patient outcomes	10 (2.3%)	45 (10.4%)	378 (87.3%)

Survey Question	Strongly disagree/ Disagree	Neither disagree nor agree	Agree/ Strongly Agree
Over the last few years, there has been a demonstrated improvement in patient outcome results	13 (2.9%)	54 (12.4%)	368 (84.6%)
Mean (SD)	**3.94 (0.64)**		
Cronbach's Alpha	**0.896**		
Patient satisfaction (Pt. S)			
Over the last few years, KSUMC has shown steady, measurable improvements in patient satisfaction	25 (5.9%)	52 (12.1%)	351 (82%)
KSUMC does a good job of assessing current patient needs and expectations.	26 (5.9%)	48 (10.9%)	367 (83.2%)
KSUMC does a good job of assessing future patient needs and expectations.	35 (8%)	55 (12.6%)	345 (79.3%)
Staff promptly resolve patient complaints.	22 (5.1%)	57 (13%)	358 (81.9%)
Patients' complaints are assessed and analyzed to identify patterns and learn from them to prevent the same problems from recurring.	22 (5.2%)	54 (12.7%)	349 (82.1%)
KSUMC uses data from patients to improve services.	16 (3.8%)	57 (13.4%)	351 (82.8%)
KSUMC regularly assesses and reports on patient satisfaction	21 (5%)	49 (11.6%)	352 (83.4%)
Data on patient satisfaction are widely communicated to hospital staff.	46 (11.2%)	65 (15.8%)	300 (73%)
KSUMC uses data on patient expectations and/or satisfaction when designing new services.	26 (6.4%)	72 (17.7%)	309 (75.9%)
KSUMC has a formal process for communication with patients regarding their questions, suggestions, and complaints	33 (8.2%)	61 (15.1%)	309 (76.6%)
Mean (SD)	**3.94 (0.68)**		
Cronbach's Alpha	**0.959**		
Core Questions (CQ)			
There were marked differences between the requirements and standards of CEBAHI and Accreditation Canada	69 (17%)	82 (20.1%)	257 (63%)
KSUMC has been working to sustain the gains and improvements after accreditation	15 (3.4%)	36 (8.3%)	382 (88.2%)

Survey Question	Strongly disagree/ Disagree	Neither disagree nor agree	Agree/ Strongly Agree
The most recent accreditation cycles were easier to implement than earlier accreditation cycles	32 (7.7%)	93 (22.4%)	291 (70%)
Staff were welcoming of the decision to engage in both national and international accreditation at the same time	37 (8.9%)	59 (14.2%)	319 (76.9%)
We were provided with training when some new changes required specific skills	25 (5.8%)	57 (13.2%)	350 (81%)
It was easy for staff to engage in both national and international accreditation at the same time	77 (18.1%)	91 (21.5%)	256 (60.4%)
We were easily able to integrate preparation for accreditation with regular duties	78 (18.3%)	81 (19%)	268 (62.7%)
It is easy for staff to continue to implement changes made in preparation for accreditation as part of regular duties	66 (15.4%)	85 (19.8%)	279 (64.9%)
It was easy for us to voice our concerns about challenges or difficulties pertaining to meeting some standards or implementing some required changes	65 (15%)	108 (25.1%)	258 (59.9%)
KSUMC has built a quality system through implementing changes based on accreditation recommendations	15 (3.5%)	53 (12.5%)	357 (84%)
The changes made by KSUMC as a result of accreditation are sustainable	16 (3.7%)	69 (16.3%)	339 (79.9%)
Accreditation is not seen as a ‘one off focused activity / quick fix’ that we do every few years but rather a way for us to improve the way we do things at KSUMC all the time	25 (5.9%)	70 (16.3%)	334 (77.8%)
Accreditation Canada standards were feasible and easy to implement	15 (3.6%)	68 (16.1%)	339 (80.3%)
CBAHI standards were feasible and easy to implement	38 (8.8%)	88 (20.5%)	304 (70.7%)
Accreditation Canada’s approach and methods of surveying is engaging and supportive of sustainable improvement	8 (1.9%)	45 (10.5%)	376 (87.6%)
CBAHI’s approach and methods of surveying is engaging and supportive of sustainable improvement	19 (4.5%)	72 (16.8%)	338 (78.8%)
Mean (SD)	**3.79 (0.53)**		
Cronbach’s Alpha	**0.914**		
Accreditation Impact (AI)			
In preparing for every accreditation cycle, important changes were implemented at the hospital.	10 (2.3%)	30 (6.9%)	395 (90.8%)

Survey Question	Strongly disagree/ Disagree	Neither disagree nor agree	Agree/ Strongly Agree
You participated in the implementation of changes implemented at KSUMC.	14 (3.2%)	50 (11.5%)	369 (85.2%)
Recommendations made to KSUMC were communicated to staff after the last survey.	26 (6.1%)	42 (9.9%)	356 (84%)
These recommendations were an opportunity to implement important changes at KSUMC.	9 (2.1%)	48 (11.2%)	370 (86.6%)
Mean (SD)	**4.06 (0.57)**		
Cronbach's Alpha	**0.840**		
Benefits of Accreditation (BoA)			
Accreditation has enabled the improvement of patient care at KSUMC.	19 (4.4%)	39 (9%)	374 (86.6%)
Accreditation has enabled the motivation of staff and encouraged teamwork and collaboration in KSUMC.	32 (7.3%)	63 (14.4%)	341 (78.2%)
Accreditation has enabled the development of values shared by all professionals at KSUMC.	27 (6.2%)	56 (12.9%)	352 (80.9%)
Accreditation has enabled KSUMC to better use its internal resources (e.g., finances, people, time, and equipment).	32 (7.5%)	74 (17.5%)	316 (74.9%)
Accreditation has enabled KSUMC to better respond to the populations' needs.	23 (5.6%)	61 (14.6%)	333 (79.8%)
Accreditation enabled KSUMC to better respond to its partners (other hospitals, diverse hospitals, private clinics, etc.).	24 (6.3%)	73 (19.1%)	286 (74.6%)
KSUMC's participation in accreditation has enabled it to be more receptive to new changes.	20 (5.1%)	55 (13.8%)	324 (81.2%)
Mean (SD)	**3.95 (0.71)**		
Cronbach's Alpha	**0.946**		

Table 3
ANOVA to compare average scores on subscales based on respondent involvement in accreditation

	One cycle		Two cycles		Three cycles		Four cycles		P-Value	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
Management and Leadership (M&L)	3.80	0.83	3.87	0.77	4.05	0.82	4.18	0.64	<0.001	ab
Quality Management (QM)	3.89	0.85	3.99	0.75	4.20	0.62	4.25	0.65	<0.001	abc
Patient Safety (PS)	3.99	0.71	4.07	0.69	4.20	0.61	4.36	0.60	<0.001	ab
Monitoring Patient Safety Goals (MPSG)	3.98	0.77	3.94	0.80	4.07	0.72	4.06	0.63	0.459	
Strategic quality planning (SQP)	3.92	0.63	3.98	0.64	4.12	0.67	4.21	0.58	0.001	ab
Human resources utilization planning (HRP)	3.75	0.91	3.60	0.86	3.83	0.89	3.87	0.80	0.073	
Quality Results (QR)	3.97	0.76	3.89	0.70	4.02	0.62	4.14	0.60	0.029	b
Patient satisfaction (Pt. S)	4.06	0.82	3.97	0.72	4.01	0.73	4.15	0.61	0.191	
Core Questions (CQ)	3.94	0.64	3.78	0.56	3.85	0.60	3.91	0.52	0.163	
Accreditation Impact (AI)	4.02	0.60	3.93	0.66	4.14	0.57	4.25	0.51	<0.001	a
Benefits of Accreditation (BoA)	4.02	0.82	3.92	0.84	4.00	0.71	4.13	0.60	0.161	
a sig association between cycle 1 and cycle 4										
b sig association between cycle 2 and cycle 4										
c sig association between cycle 1 and cycle 3										

Table 4
ANOVA to compare average scores on subscales based on respondent participation in Canadian vs KSA accreditation

	Canadian only		CBAHI only		Both		P-Value
	Mean	SD	Mean	SD	Mean	SD	
Management and Leadership (M&L)	3.63	0.95	3.86	0.58	4.04	0.74	<0.001
Quality Management (QM)	3.79	0.88	3.89	0.74	4.15	0.65	<0.001
Patient Safety (PS)	3.88	0.82	4.06	0.60	4.25	0.59	<0.001
Monitoring Patient Safety Goals (MPSG)	3.62	0.70	3.71	0.53	3.90	0.61	0.002
Strategic quality planning (SQP)	3.86	0.79	3.91	0.56	4.11	0.62	0.006
Human resources utilization planning (HRP)	3.57	0.97	3.66	0.93	3.71	0.83	0.508
Quality Results (QR)	3.84	0.74	3.81	0.56	3.98	0.62	0.098
Patient satisfaction (Pt. S)	3.85	0.77	3.80	0.77	3.98	0.65	0.163
Core Questions (CQ)	3.73	0.55	3.78	0.52	3.81	0.52	0.563
Accreditation Impact (AI)	3.90	0.66	3.93	0.46	4.11	0.55	0.009
Benefits of Accreditation (BoA)	3.82	0.76	3.95	0.67	3.98	0.69	0.253

Table 5
T-Test to compare subscale score for each survey cycle

	AccCan2011	AccCan2014	AccCan2017	CBAHI2017
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Management and Leadership (M&L)	4.09 (0.74)	4.05 (0.74)	3.99 (0.80)	4.02 (0.72)
Quality Management (QM)	4.18 (0.70)	4.16 (0.66)	4.09 (0.72)	4.12 (0.67)
Patient Safety (PS)	4.29 (0.68)	4.25 (0.63)	4.21 (0.65)	4.23 (0.60)
Monitoring Patient Safety Goals (MPSG)	3.93 (0.62)	3.89 (0.63)	3.88 (0.65)	3.88 (0.60)
Strategic quality planning (SQP)	4.16 (0.63)	4.11 (0.66)	4.08 (0.67)	4.08 (0.62)
Human resources utilization planning (HRP)	3.83 (0.79)	3.72 (0.85) *	3.68 (0.88) *	3.70 (0.84) *
Quality Results (QR)	4.08 (0.59)	4.00 (0.63)	3.96 (0.65) *	3.96 (0.61) *
Patient satisfaction (Pt. S)	4.09 (0.59)	4.00 (0.67) *	3.95 (0.69) *	3.96 (0.67) *
Core Questions (CQ)	3.88 (0.49)	3.81 (0.55)	3.80 (0.54) *	3.81 (0.52) *
Accreditation Impact (AI)	4.18 (0.53)	4.11 (0.58)	4.10 (0.57)	4.09 (0.54)
Benefits of Accreditation (BoA)	4.05 (0.63)	4.00 (0.67) *	3.97 (0.71) *	3.98 (0.69)

*No significant difference between respondents who participated vs. those who did not participate in this accreditation cycle

Table 6
Linear mixed regression model to assess association between dependent variables and survey subscales

	Quality Results		Accreditation Impact		Benefits of Accreditation	
	B (Std Error)	P-Value	B (Std Error)	P-Value	B (Std Error)	P-Value
(Constant)	-0.002 (0.03)	0.943	-0.008 (0.038)	0.834	-0.022 (0.035)	0.526
Management and Leadership (M&L)	0.133 (0.059)	0.025	0.163 (0.074)	0.028	-0.182 (0.069)	0.009
Quality Management (QM)	-0.032 (0.076)	0.671	-0.151 (0.095)	0.114	0.094 (0.090)	0.299
Patient Safety (PS)	0.017 (0.071)	0.814	0.107 (0.089)	0.227	0.070 (0.084)	0.402
Monitoring Patient Safety Goals (MPSG) – Factor 1	0.039 (0.063)	0.538	0.203 (0.077)	0.009	-0.085 (0.074)	0.251
Monitoring Patient Safety Goals (MPSG) – Factor 2	0.052 (0.033)	0.112	0.100 (0.040)	0.014	-0.088 (0.038)	0.023
Strategic quality planning (SQP)	0.124 (0.072)	0.087	0.172 (0.091)	0.059	0.024 (0.086)	0.779
Human resources utilization planning (HRP)	0.121 (0.063)	0.054	-0.144 (0.079)	0.067	0.224 (0.073)	0.003
Quality Results (QR)			-0.002 (0.08)	0.985	0.248 (0.074)	0.001
Patient satisfaction (Pt. S)	0.195 (0.061)	0.002	0.006 (0.078)	0.940	-0.078 (0.074)	0.293
Core Questions (CQ) – Factor 1	0.254 (0.072)	0.001	0.279 (0.091)	0.003	0.215 (0.087)	0.014
Core Questions (CQ) – Factor 2	0.025 (0.051)	0.626	-0.011 (0.064)	0.861	0.026 (0.060)	0.666
Accreditation Impact (AI)	-0.001 (0.051)	0.985			0.331 (0.056)	<0.001
Benefits of Accreditation (BoA)	0.177 (0.053)	0.001	0.371 (0.063)	<0.001		