ABSTRACT

Title of Dissertation:	THE IMPACT OF INTERNATIONAL ACCREDITATION ON THE QUALITY OF HEALTH SERVICES AT KING FAHD UNIVERSITY HOSPITAL, SAUDI ARABIA: A MIXED METHODS APPROACH
	Deema Saad Al Shawan, Doctor of Philosophy, 2019
Dissertation directed by:	Dr. Luisa Franzini, Professor and Chair, Department of Health Policy and Management

The Joint Commission International Accreditation (JCIA) is perceived worldwide as the symbol of exceptional quality of care. Despite the popularity of international accreditation, evidence of its effectiveness on improving health care quality is inconclusive. This dissertation research utilized a Convergent parallel mixed method framework to evaluate the impact of the JCIA process on quality and to identify the factors that influence the effectiveness of this process at King Fahd Hospital of the University in Khobar, Saudi Arabia. An interrupted time series analysis was conducted to assess the changes in a total of 12 quality outcomes pre and post accreditation. Furthermore, a qualitative approach was used to investigate the attitudes and perceptions of 31 health providers towards this process and the factors that influence its success.

The quantitative results suggested that the JCIA had a positive impact on 9 out of 12 outcomes. The improved quality outcomes included: the average length of stay, the percentage of hand hygiene compliance, the rate of nosocomial infections, the

percentage of radiology reporting outliers, the rate of pressure ulcers, the percentage of the correct identification of patients prior to medication administration, the percentage of critical lab reporting within 30 minutes, and the bed occupancy rate. The outcomes that did not improve were the rate of patients leaving the ER without being seen, the percentage of OR cancelations on the day of the or and the rate of patient falls.

The qualitative analysis suggested that the JCIA was perceived positively by all participants. Some of the perceived advantages of international accreditation included the transformation of the organizational culture to a culture that promotes continuous quality improvement, standardization, and the reduced paperwork in some departments. The participants' responses also indicated that there were many factors that influence the success of the process. Examples of the factors identified in the study include the increased workload and the providers' resistance to participate in the JCIA process. In conclusion, international accreditation seemed to have a positive impact on quality outcomes and was received positively by providers. Nevertheless, the factors that hindered the JCIA process need to be addressed by the hospital's leadership to ensure more efficient quality improvement efforts during future accreditation cycles.

THE IMPACT OF INTERNATIONAL ACCREDITATION ON THE QUALITY OF HEALTH SERVICES AT KING FAHD UNIVERSITY HOSPITAL, SAUDI ARABIA: A MIXED METHODS APPROACH

by

Deema Saad Al Shawan

Dissertation submitted to the Faculty of the Graduate School of the
University of Maryland, College Park in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
2019

Advisory Committee:
Dr.Luisa Franzini, Chair
Dr. Craig Fryer
Dr.Eva DuGoff
Dr.Jie Chen
Dr.Lori Simon

Dedication

I dedicate this dissertation research to the memory of my mother, Fawziah Al Shawan whose strength and dedication inspire me to this day and to the memory of my father, Dr. Saad Al Shawan who encouraged me to pursue the field of public health and follow my dreams.

Acknowledgments

I'd like to first and foremost express my gratitude to my thesis professor Luisa Franzini for her continuous support, encouragement, and guidance. I would also like to thank my dissertation committee members Dr. Craig Fryer, Dr. Eva DuGoff, Dr. Jie Chen, , and Dr. Lori Simon for their great support and invaluable advice. This dissertation would not have been possible without Dr. Fryer's expertise that greatly helped me in conducting a mixed methods research for the first time working on this dissertation. I'm also thankful to Dr. DuGoff for her constructive criticism and insightful comments. I am grateful to Dr. Chen for her valuable advice enabling me to look at my methods and data more critically. Moreover, I'd like to express my gratitude to Dr. Lori for her helpful advice on conducting qualitative research, asking the right questions and understanding different perspectives. My sincere thanks go to Dr. Al Qahtani for her insights on the inner workings of King Fahd University Hospital and her dedication to improve the quality of services and the safety of patients. I wish to also thank the University of Maryland for allowing me the great opportunity of being a part of this Ph.D. program and the honor of receiving the Dean's Graduate Scholar Award in 2019.

To the staff participants at King Fahd Hospital, I would like to thank you for taking the time out of your busy schedules to assist me in collecting key data for my research. I am also indebted to the University of Dammam and the Saudi Ministry of Higher Education for sponsoring my education and investing in me to complete my graduate studies. Last but not least, I would like to thank my friends and family especially my two brothers Amr and Bader for their love and support, without whom I would not have made it this far.

Table of Contents

List of Tables

List of Figures

List of Abbreviations

ALS	Average Length of Stay
AMA	The American Medical Association
CAP	College of American Pathologists
CBAHI	Central Board of Accreditation for Health Care Institutions
DQS	The Directorate of Quality and Safety
ER	Emergency Room
HIS	Hospital Information System
IAU	Imam Abdulrahman Bin Faisal University
ICU	Intensive Care Unit
IT	Information Technology
ITS	Interrupted Time Series
IV	Intravenous therapy
JCI	The Joint Commission International
JCIA	The Joint Commission International Accreditation
KAMC	King Abdulaziz Medical City
KAMC	King Abdulaziz Medical City
KAUH	King Abdulaziz University Hospital
KFHU	King Fahd Hospital of the University

KPI	Key Performance Indicator
MOH	Ministry of Health
OR	Operating Room
OVR	Occurrence Variance Report
SAMSO	The Saudi Medical Services Association
TQM	Total quality management
UAE	United Arab Emirates
WHO	World Health Organization
GT	Grounded Theory

Chapter 1: Introduction

There is a global trend towards developing a more efficient management of resources and health services. A reflection of this trend is the pursuit of international accreditation in health care organizations. The Joint Commission International (JCI) is considered by many as the world's leader in health care accreditation. Since 1951, over 1000 health organizations around the world were JCI accredited at least once with one of the highest numbers of accredited hospitals being in Saudi Arabia. ("JCI-Accredited Organizations," 2017; Khan & Alam, 2014) A total of 106 health organizations were accredited at least once in Saudi Arabia, making it rank third in the list of countries with the highest number of accredited hospitals. Policy makers view the JCI's golden seal of approval as an indicator of a hospital's high quality of services and a guarantee of patient safety. Moreover, the JCI accreditation is perceived by hospital administrators as the ultimate tool to improve the quality of services and to cut down on costs.

Despite JCI accreditation's popularity, its impact on the quality of health services and patient outcomes remains controversial. (Greenfield & Braithwaite, 2009) This controversy is due to the inconsistent evidence on the effectiveness of accreditation in improving the quality of services, patient outcomes, and organizational cultures. (Brubakk et al., 2015) This dissertation research investigated the impact of the JCI accreditation on the quality of health services in King Fahd Hospital of the University (KFHU) in Khobar, Saudi Arabia. The assessment was accomplished using a total of 12 quality measures related to a variety of processes, and outcomes. Moreover, the attitudes and perceptions of health professionals will also be assessed in order to identify key challenges in the successful implementation of the JCIA.

The Accreditation Process and its Goals

The accreditation process is usually a voluntary external evaluation of a health care organization by measuring its level of compliance with a set of predetermined standards. Based on the results of the assessment, policies and

interventions are implemented continuously to improve the performance of these organizations. A list of these standards and their descriptions are published in the accreditation manual and regularly updated by the Joint Commission International (JCI). The standards "define the performance expectations, structures, and functions that must be in place for a hospital to be accredited by JCI." ("JCI Accreditation Standards," 2018) The manual is divided into three sections, namely: 1) Accreditation Participation Requirements 2) patient-centered care standards and 3) health organization-centered standards. Furthermore, the additional section for academic medical center accreditation was added to recent editions of the manual. The academic section includes requirements for human subject research and medical professional education. ("JCI Accreditation Standards", 2018)

The JCI accredits eight types of health settings such as primary care centers, hospitals, and academic medical center hospitals. The main goals of pursuing accreditation are to demonstrate the commitment to quality and patient safety, provide a safe environment for employees, create a competitive advantage, and promote continuous improvement. (Rawlins, 2001) As seen in [Figure 1, Appendix A], there are ten steps that health organizations usually follow to obtain the JCIA. This process is typically completed within 18 to 24 months on average ("Pathway to JCI", 2018) The first step is for the organization's leadership to familiarize itself with the JCI's policies and procedures and to communicate it with staff and team members involved in the process. Moreover, this step also includes reviewing the most up to date hospital accreditation manual and survey process guide.

The second step involves conducting a baseline assessment of the current performance of the hospital against the JCI standards. The purpose of this evaluation is to build the hospital's accreditation action plan. During the third step, current policies must be assessed and updated to be JCI compliant. During the fourth and fifth steps, the leadership must make target improvements, such as decreasing adverse events, to overcome any challenges and promote a culture of safety before the accreditation process. The sixth step requires leaders to assess the team's readiness for the mock survey. The readiness can be assessed by either utilizing JCI consultants or

conducting patient tracers. During the seventh step, staff must be trained to sustain changes and improvements. The eighth and ninth steps involve detecting and correcting any remaining deficiencies and conducting a mock survey four to six months prior to the actual survey to spot any issues and any areas of noncompliance. Lastly, the final stage is to make the final preparations and to schedule the final on-site survey. ("Pathway to JCI", 2018)

Historical Origins of Accreditation in Health care

Looking back at the history of health services assessment efforts can provide a better understanding of the link between accreditation and quality. In the early 1800s, health care services were disorganized and of poor quality in the US because they were under the control of proprietary as well as for-profit institutions. (Luce, Bindman, & Lee, 1994) Several organizations aimed to overcome this issue, including the American Medical Association (AMA), which was founded in 1847. The establishment of the AMA partially influenced Abraham Flexner, an American educator, to write his report in 1910 to the Carnegie Foundation, which documented the poor quality of the country's major hospitals and medical schools. (Luce, Bindman, & Lee, 1994)

The publication of this report was followed by another milestone in health care quality, Dr. Ernest Codman's contribution to the creation of the Hospital Standardization Program in 1917. These standards were created by this pioneer in health reform, to address the need to improve the conditions of hospitals and to track patients to ensure the effectiveness of the care they received. They were also known as "the minimum standards" and they focused on care within hospitals including maintaining medical records and ensuring periodic staff meetings and clinical reviews. (Luce, Bindman, & Lee, 1994)

Following the adoption of the minimal standards, the American College of Surgeons initiated the process of surveying hospitals against those standards to determine their eligibility for accreditation. After that, the Joint Commission on Accreditation of Health Care Organizations (JCAHO) was formed in 1952 by the American College of Physicians, the American Hospital Association, the AMA, the Canadian Medical Association and the American College of Surgeons. JCAHO was a non-profit organization that provided the voluntary accreditation

of health organizations using the minimum quality standards. In 1996 JCAHO became the JCI and shifted from using the minimal-standards approach to what is referred to as the optimal achievable standards. This shift was due to multiple reasons, including the fact that most hospitals already met the minimum standards and the advancement in quality improvement assessment tools and techniques. (Luce, Bindman, & Lee, 1994)

Accreditation in the Saudi Context

Health accreditation in Saudi Arabia dates back to 1994 when the Saudi Medical Services Association (SAMSO) standards were created by Saudi ARAMCO, a national petroleum and natural gas company formerly known as the Arabian American Oil Company. The SAMSO standards must be met by any private or public hospitals to be approved as referral hospitals for ARAMCO employees. After that, other accreditation programs soon began to follow SAMSO's lead to ensure a high quality of care at their affiliated health organizations. An example is the Makkah Region Quality Program (MRQP) in 2003. In an attempt to ensure consistent quality care across the nation, the MOH established the primary national health accreditation program known as the Central Board of Accreditation for Health Care Institutions (CBAHI) in 2005. Meeting the CBAHI accreditation is mandatory for any hospital to operate in the country. (Qureshi, Ullah, & Ullah, 2012)

In addition to complying with CBAHI, some health organizations decided to voluntarily meet international standards since it was considered a step further in meeting higher quality of care and patient safety. For that reason, many hospitals pursued international accreditation programs such as the JCI, the Commission on Accreditation for Rehabilitation Facilities (CARF) and the International Standard Organization (ISO). Nevertheless, the JCIA was the most popular accrediting program since it is the most comprehensive and it aligned with many national quality improvement goals. According to Dr. Mustafa Tayan, the Saudi World Health Organization (WHO) representative, meeting the JCIA standards is one of the main methods to comply with the Saudi Ministry of Health's (MOH) Comprehensive and Integrated Health Care Strategy. This strategy's main goal is to encourage patient centered care and to create and maintain a culture of patient safety in health

organizations nationwide. (MOH, 2012) The first hospital to obtain the JCIA was King Faisal Specialist Hospital and Research Center in the year 2000 which marked the beginning of the current trend of pursuing the JCIA in the Kingdom. (Qureshi, Ullah, & Ullah, 2012) Since then a total of 106 health organizations received the JCIA at least once. ("JCI-Accredited Organizations," 2017)

King Fahd Hospital Characteristics and Accreditation History

King Fahd Hospital of the University (KFHU) is a public hospital established by The Ministry of Health (MOH) in 1981. The hospital is affiliated with Imam Abdulrahman Bin Faisal University (IAU), formerly known as the University of Dammam, and its main purpose is to train medical students during their clinical years. The hospital initially had a 381-bed capacity, which increased later to 550 beds to meet the increasing demands of the community. KFHU offers both preventive and curative services such as Cardiology, Radiology, Psychology and Internal Medicine. (KFHU, 2015)

The Directorate of Quality and Safety (DQS) at KFHU is responsible for providing support to all the hospital's departments to develop and implement initiatives to improve the quality of care. Another main role of the DQS's is to ensure the continued compliance to the standards of quality and patient safety as set by the Joint Commission International (JCI), Saudi Central Board for Accreditation of Health Care Institutions (CBAHI) and other accreditation agencies. (KFHU, 2015) Efforts to obtain the JCIA included overseeing and providing resources to employees to comply with the JCI standards.

The hospital's leadership initiated the JCIA process for the first time in 2014. The mock survey was conducted in October 2014 and a few areas of improvement were identified and improved and the hospital was finally JCI accredited in 2015. (KFHU, 2015)

Public Health Significance

The JCIA can have a significant impact on different types of health settings, including teaching hospitals, which exceed enhancing performance on an organizational level. The increasing number of accredited hospitals

could influence public health on a national level. For one thing, one of the JCI's missions is to offer its expertise to enable countries to achieve their national and regional quality and safety goals. (JCI, 2016) For instance, according to the Saudi Ministry of Health (MOH) pursuing the JCIA enabled hospitals to meet the nation's patient safety standards. (MOH, 2012)

Another potential benefit is that the Joint Commission works with health organizations by encouraging them to pursue evidence-based practices. Some researchers argue that implementing more standardized care across hospitals and health systems can cut down on costs and improve patient safety. These standards can be used to provide an ideal critical pathway which is a visual representation of the ideal process to provide a service. Therefore, these evidence-based standards can facilitate the complex decision-making process for health providers which will decrease medical errors and ensure consistent, high-quality treatments. (Siemens, 2016)

Obtaining the JCIA can also increase the public's confidence in the health services provided giving the hospital a more competitive edge than other hospitals in the private sector. (MOH, 2012) One of the arguments in favor of provider competition is that it can influence providers to find more innovative ways to decrease costs, increase the quality of care and increase productivity. (Penelope Dash, MD; and David Meredith, 2010) Other benefits of the JCIA process include: creating a safer environment not only for patients but health providers, providing quality training for employees, increasing the involvement and commitment of the leadership and supporting an organization's missions and goals. (JCI, 2016) For these reasons, public health care professionals perceive the JCIA as a tool to adapt to the dynamic field of health care and to achieve the highest quality and patient safety goals.

Aims

This dissertation research attempted to evaluate the effect of the JCIA process on both patient-centered standards and organization-centered standards. Furthermore, this study also aims to evaluate health care

professionals' attitudes towards its implementation to identify facts that influence the effectiveness of the JCIA in improving the quality of services at KFHU.

Aim 1: To evaluate the impact of the JCIA process on quality improvement and patient safety. The impact of this process was measured using a total of 12 key performance indicators (KPIs) to detect the changes for each standard during the period of study. Table 1.1 lists each KPI and its associated null and alternative hypotheses.

Table 1.1: The Null and Alternative Hypotheses for each study outcome

KPI	Hypothesis
1. Percentage of hand hygiene compliance	H_0: Receiving the JCIA did not lead to the increase of the hand hygiene compliance by health providers. H_1: Receiving the JCIA did lead to the increase of the hand hygiene compliance by health providers.
2. Rate of hospital-acquired infections	H_0: Receiving the JCIA did not lead to the decrease of hospital-acquired infections. H_1: Receiving the JCIA did lead to the decrease of hospital-acquired infections.
3. Percentage of correct identification of patients during medication preparation by nurses	H_0: Receiving the JCIA did not lead to the increase of correct patient identification during medication perpetration by nurses. H_1: Receiving the JCIA did lead to the increase of correct patient identification during medication perpetration by nurses.
4. Percentage of radiology report turnaround time outliers	H_0: Receiving the JCIA did not lead to the decrease in the percentage of the radiology report turnaround time outliers H_1: Receiving the JCIA did lead to the decrease in the percentage of the radiology report turnaround time outliers.
5. Percentage of laboratory Critical Values Reporting within 30 minutes	H_0: Receiving the JCIA did not lead to the decrease in the percentage of laboratory Critical Values Reporting within 30 minutes H_1: Receiving the JCIA did lead to the decrease in the percentage of laboratory Critical Values Reporting within 30 minutes
6. Pressure Ulcer Incidence rate per 1000 Patients' Days	H_0: Receiving the JCIA did not lead to reducing the pressure ulcer rate. H_1: Receiving the JCIA did lead to reducing the pressure ulcer rate.

7. Percentage of Operating Room (OR) cancelations on the day of a procedure	H_0: Receiving the JCIA did not lead to reducing the percent of OR cancelations on the day of a procedure H_1: Receiving the JCIA did lead to reducing the percent of OR cancelations on the day of a procedure.
8. The rate of patients who left the ER without being seen (per10000 patients)	H_0: Receiving the JCIA did not lead to reducing the rate of patients who left the ER without being seen. H_1: Receiving the JCIA did lead to reducing the rate of patients who left the ER without being seen.
9. Mortality rate	H_0: Receiving the JCIA did not lead to reducing the mortality rate. H_1: Receiving the JCIA did lead to reducing the mortality rate.
10. Rate of Patient falls (per 10000 patients)	H_0: Receiving the JCIA did not lead to reducing the rate of patient falls. H_1: Receiving the JCIA did lead to reducing the rate of patient falls.
11. Average Length of Stay	H_0: Receiving the JCIA did not lead to reducing the average length of stay. H_1: Receiving the JCIA did lead to reducing the average length of stay.
12. Bed Occupancy Rate	H_0: Receiving the JCIA did not lead to reducing the bed occupancy rate. H_1: Receiving the JCIA did lead to reducing the bed occupancy rate.

Aim 2: To investigate the attitudes and perceptions of health professionals towards the overall JCIA process and to identify factors that will facilitate its implementation.

This investigation aimed to identify challenges in the implementation of the JCIA in a Saudi teaching hospital and to provide recommendations to facilitate this process to the hospital's administrators as well as the JCI.

Mixed Methods Framework

A mixed methods framework was used to meet the aims of the study by collecting and analyzing both qualitative and quantitative data. Using this approach can more likely yield useful results since the impact of a complex intervention, such as accreditation, is difficult to interpret using either method individually. Moreover, pursuing accreditation can cause changes that cannot be assessed using quantitative measures such as the changes in the behavior and the attitudes of health providers. Additionally, qualitative data can complement quantitative data by providing context that might explain the possible causes of the changes or lack thereof in some quality outcomes. Therefore, a Convergent parallel design was selected for this dissertation research since it puts equal priority on both types of data. (Creswell & L., 2011)

The first step was to collect and analyze quantitative and qualitative data separately as seen in Figure 1.1. This step included developing the research questions, identifying the study sample, and the methodology for both quantitative and qualitative data (chapters 3&4). The quantitative data were collected using KPIs that measure each quality outcome to determine whether it improved before, during and after the accreditation. As for the qualitative data, they were collected during individual interviews and focus groups with administrative employees and different types of health providers at King Fahd University Hospital.

The third step is to report the results of each section (chapter 5). The quantitative results were reported in both a table format as well as figures to illustrate the patterns in the study outcomes before, during, and after the intervention period. As for the qualitative results, they were reported in tables followed by a more descriptive

analysis. Lastly, the mixed results were interpreted; this step is also referred to as the point of interface. During the last step, "the researcher identified relationships, contradictions, convergence, and divergence in the different sources of data." (Creswell & L., 2011)

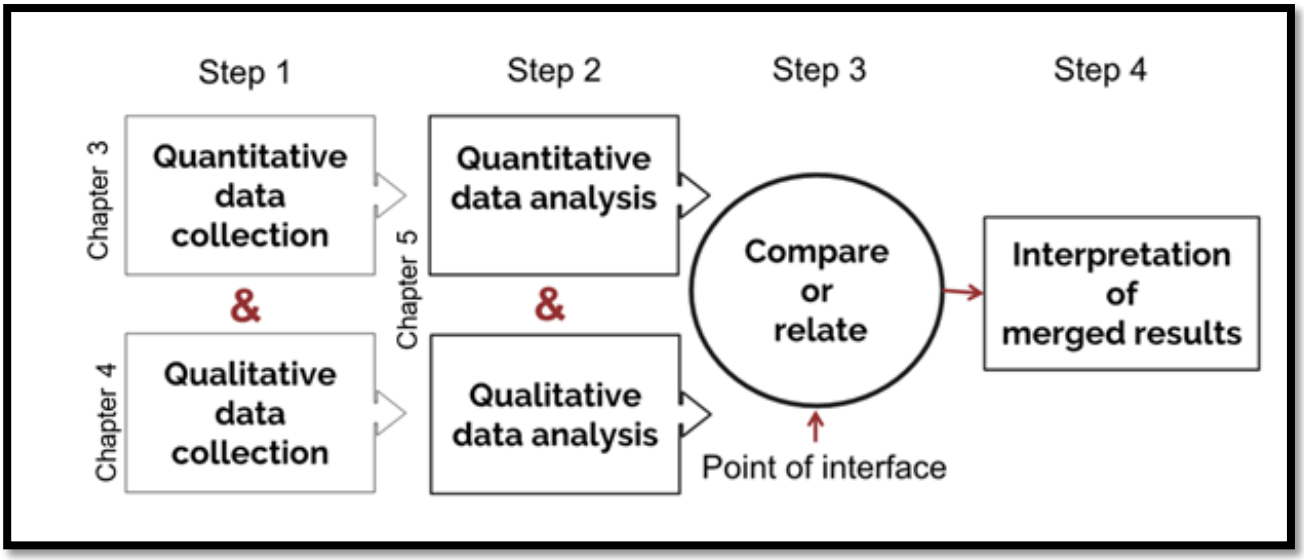

Figure 1.1: Mixed methods Framework

Chapter 2: Review of Literature

The Impact of the JCIA on the Quality of Care

Pursuing the JCIA became a worldwide trend despite the lack of evidence proving that accreditation is an efficient use of resources for improving quality. (Greenfield & Braithwaite, 2009) Researchers studied the impact of this process on both clinical and process outcomes using a variety of quality measures. Quality measures are tools that can be used to quantify health processes, outcomes, organizational structures, providers and patient perceptions. (The Centers for Medicare & Medicaid Services, 2018) These measures relate to different quality goals or a set of predetermined standards such as the JCIA standards or standards developed by other organizations. An example of quality measures is Key Performance Indicators (KPIs) which are quantifiable measures used to assess an organization's progress in meeting certain goals. The following literature review will include studies from various settings and countries to illustrate the inconsistent evidence on the impact of this process on the quality of services.

The majority of published literature on this topic consists of descriptive studies that measure perceived changes after accreditation by health professionals. An example is a study conducted at King Abdulaziz University Hospital (KAUH), a hospital in Jeddah Saudi Arabia. KAUH is one of the largest hospitals in the country with a bed capacity of 878. The nurses were asked about their opinions regarding their perceptions towards the influence of the JCIA process on the quality of services and patient safety. A total of 870 registered nurses were surveyed using a five-point Likert scale. The survey collected demographic data as well as data on work experience. Furthermore, the questionnaires included questions on the perceived change after the accreditation in four categories namely: nursing clinical information, patient medications information, risk management information and nurses' action to prevent risk. The nurses' perceptions towards the improvements varied in each category. For instance, there was a 44% perceived improvement in complying with the mandate to educate patients about safety. On the other hand, there was only a 7% perceived improvement in documenting patients' current medication information. Overall, the study

has found that there was a statistically significant perceived improvement in the quality of care and safety post-accreditation. (Awa, et al., 2011)

Such surveys on the perceptions of providers may provide insight and some helpful recommendations to decision makers to improve this process. Nevertheless, descriptive studies are uncontrolled and subject to bias and confounders. More recently, researchers started to adopt quasi-experimental designs to study the impact of this complex intervention to produce more reliable results. A research paper conducted in Jordan focused on evaluating the effects of implementing the JCI accreditation on five outcome performance measures. Each of the five outcome measures correspond to one of the JCI standards. The outcomes measures include the rate of staff turnover, rate of readmission, rate of return to ICU, rate of readmission to surgery and rate of completeness of medical records. Since the number of hospitals in this study was small, the researchers also computed a quality improvement index which is a combination of all the quality measures to calculate the average ratio of improvement. (Halasa, Zeng, Chappy, & Shepard, 2015)

The Jordan study utilized a difference-in-differences approach to compare the impact of this process on two accredited and two unaccredited hospitals in Jordan. All of the hospitals were private acute care hospitals in the capital Amman and had a similar bed capacity. The data were collected retrospectively at two periods of time which are the pre-intervention period in 2006 and during the intervention period in 2008 and 2009. The results indicated that three out of five measures showed improvement in the intervention group in comparison to the control group. The three outcomes that improved were under the supervision of the hospital management which included: the rate of return to the ICU, the rate of staff turnover and the rate of medical record completion. The researchers speculated that there was no improvement in the rate of return to surgery and rate of readmission since they are under the control of independent physicians who have the authority to refer patients to multiple hospitals which might influence of the accreditation status on these measures. As for the quality improvement index, it showed a great improvement in the

hospitals going through the accreditation process in comparison with unaccredited hospitals. (Halasa, Zeng, Chappy, & Shepard, 2015)

Another study conducted in the United Arab Emirates (UAE) was the first to utilize interrupted time series analysis to investigate the impact of the JCIA on hospital quality measures. The researchers selected this quasi-experimental design because it may be able to differentiate between the effects of time and that of the intervention. The research was conducted in a 150-bed multi-specialty hospital in Abu Dhabi during a 48-month period. Moreover, the differences in 27 quality performance measures, such as mortality rates, were compared between two time periods: one-year pre-accreditation (2009) and three years post accreditation (2010, 2011 and 2012). The main source of data was a random sample of 12,000 medical records during the period of study. (Devkaran & O'Farrell, 2014)

The quality and patient safety measures were related to structures, processes, and outcomes. According to the results, the preparation for the formal JCI survey had a significant positive impact on 74% of the quality measures. However, accreditation had a negative impact on 48% of measures and a positive effect on merely 4% of measures during the post-accreditation period. Nevertheless, the study found a residual benefit three years after the intervention and found that the improvements were maintained at 90%, which is 20% greater than the baseline level in 2009. The researchers concluded that despite the drop in performance after the survey, the results showed that the improvements from the accreditation were sustained during the three-year accreditation cycle. (Devkaran & O'Farrell, 2014)

The UAE study had some limitations that may have impacted the validity of its results. For one thing, this study was limited to one hospital as it was necessary to have a controlled environment using a time-series study design. Nevertheless, having a controlled environment allowed the researchers to attribute the changes in performance measures to the intervention as opposed to other possible confounders. Moreover, it is also important to note that the accreditation process requires a significant amount of time and resources. Therefore, the results of this study which was conducted in the resource-rich UAE cannot be generalized to developing countries. Another limitation is that the study focused mostly on process measures and only seven of them were outcome measures. The

challenge in studying the impact of outcome measures is due to the difficulty of linking their change to the accreditation alone. (Devkaran & O'Farrell, 2014)

In conclusion, the overall impact of international accreditation is difficult to measure since it is a complex, multifaceted intervention that resulted in inconsistent results globally. The heterogeneity of the results is exaggerated as a result of the inconsistency in study designs, hospital settings, health systems in different countries and the financial and resource constraints. The most dominant methods were descriptive studies that relied on the perceptions of different health providers such as nurses. To achieve more reliable results researchers adopted quasi-experimental designs such as difference-in-difference and Interrupted Time Series (ITS) to measure the impact of the JCIA process since conducting an experimental design may not always be feasible. (Brubakk et al., 2015)

This study utilized a mixed methods approach using both a quasi-experimental design and a qualitative approach to provide a comprehensive overview of the impact of the JCIA. This mixed methods approach yielded more useful results to decision makers and other stakeholders to improve the implementation of this process and overcome its challenges especially in a teaching hospital in Saudi Arabia. Furthermore, since previous studies did not have a consensus on the impact of accreditation on the overall quality of services, this study focused on certain components individually. Therefore, this research served as an exploratory study and included 12 KPIs to prioritize which areas of quality are the most impacted by this process to better plan future research. (Brubakk et al., 2015)

Challenges in the Implementation of Accreditation and the Role of Leadership

Most studies on the factors that influence the effectiveness of international accreditation focused on the perceived changes in the quality of health services by interviewing or surveying health providers. Furthermore, published research addressed both the role of hospital leadership and the challenges hindering the process. Leadership is one of the most crucial factors in ensuring the success of the implementation of accreditation. Accreditation can be viewed as an agent of change since it impacts all areas of a health organization and its stakeholders. (Pomey et al., 2004) In fact, many of the JCIA standards emphasize the importance of effective

leadership to ensure the cooperation of personnel at all levels, thus ensuring the success of the many changes introduced by the accreditation process. (Abolfotouh et al., 2014)

These standards reflect one of William Deming's, the founding fathers of Total Quality Management, main principles. This principle emphasized that the role of management is not merely supervision and oversight, but leadership and motivating followers to accomplish common goals. (Deming, 2000) In the context of accreditation, the significance of leadership lies in having a clearly communicated vision to gain the support of the employees in the implementation of quality systems or the introduction of any changes to the organization. (Al Attal, 2009) Ineffective leadership can lead to difficulties in motivating and changing the behaviors of employees to accomplish common goals.

Several studies supported the importance of leadership in quality improvement and in overcoming barriers to the implementation of accreditation. For instance, a cross-sectional study investigated the perceptions of a total of 1,048 Lebanese nurses toward accreditation in 59 different hospitals. Data were collected using a survey with a five-point Likert scale on nine factors impacting the accreditation process, including resource utilization, use of data and leadership commitment and support. The results of the study indicate that a better-perceived impact was found in medium and small hospitals. This better perception leads the researchers to conclude that this supports existing evidence that "large-sized hospitals tend to be more hierarchically and bureaucratically organized which makes implementation of quality work more challenging." (El-jardali et al., 2007) Nevertheless, the only factor that had a perceived positive impact in all hospitals, regardless, was the leadership and commitment of top-level managers. (El-jardali et al., 2007)

There are also multiple studies around the world that addressed the obstacles and factors that might affect the JCIA process. A major potential barrier is the resistance from health providers to changes and additional workload introduced by the accreditation process. For instance, a study conducted in Yemen surveyed and worked with two teams from two health care organizations to collect information on the difficulties in implementing total quality

management (TQM) principles. The researchers found that resistance to change can be an obstacle to the implementation of Western-quality improvement models in Yemeni health organizations. The resistance was due to other factors such as the lack of technical understanding of quality improvement principles, the lack of trained staff to implement them and cultural differences. For instance, some private organizations are family owned in Yemen, which makes it difficult to have routine reviews and meetings with family members to assess the quality of services. Inexperience and cultural differences may have led to the poor performance in the implementation of the TQM model in the two organizations under study. This led the authors to conclude that leadership plays a crucial role in changing the organizational culture from viewing quality measurement as a threat to a necessary means for improvement. (Al-Zamany et al, 2002)

Another example is a study conducted in King Abdulaziz Medical City (KAMC) in Riyadh, Saudi Arabia. The study assessed the perceptions of nurses toward the JCIA's impact on the quality of care. KAMC provides tertiary care and has more than 1000 beds. The researchers utilized a cross-sectional electronic survey to collect information from 476 nursing personnel to assess their perceived impact of accreditation on the quality of health care. A scoring system was used and percentages were calculated for various domains of health care such as the leadership's commitment. In addition to descriptive statistics, a logistic regression was conducted to identify predictors of nurses' perception toward JCIA and its impact on the quality of care. (Abolfotouh et al., 2014)

The results found that most nurses had an overall neutral perception of the accreditation process. Moreover, the results indicated that the majority of nurses perceived an average level improvement in quality, a mean percentage of 66.87+16.71, as a result of accreditation. There was also variability in the perceived perception of improvements in various domains. The highest increase in perceived quality was in the strategic quality planning with a percentage mean score of (70.76+16.64). Strategic planning includes statements such as providing nurses with adequate time to plan for the accreditation process and having specific quality improvement goals in each department. The lowest

perceived quality was in the human and resource utilization domain which includes education and quality improvement methods. (Abolfotouh et al., 2014)

The results of the KAMC study provided information that is helpful for decision makers as a basis for further research. By analyzing the perceptions of 386 nurses, the researchers were able to identify potential predictors of a nurse's favorable perception of accreditation such as their work experience. Nevertheless, this study does not present sufficient evidence on the positive impact of accreditation as a result of the lack of pre-intervention measures and the potential participant bias. Lastly, the research was conducted in a large tertiary hospital with diverse health providers which may not be representative of the perceptions of nurses in other settings.

Chapter 3: Methodology for the quantitative analysis

Conceptual Model

The JCIA is a complex intervention that impacts the multi-dimensional process of health care delivery. Therefore, the most appropriate conceptual framework for this study is the Donabedian Model [Figure 3.1]. This paradigm evaluates quality by analyzing the three dimensions of health care namely: structures (inputs), processes and outputs which are all impacted by the accreditation process. Structures refer to the setting in which care is delivered which includes equipment, facilities, and personnel. As for processes, it includes all the behaviors of health providers and their direct and indirect interactions with patients. Lastly, outcomes can be described as "a change in a client's current and future health status that can be attributed to antecedent health care." (Iles, 2006, pp.199)

The Donabedian model is flexible enough to be applied to the different quality outcomes in this study since the accreditation process results in changes to all its components. This model can also provide a basis to develop measures for processes and outcomes. For instance, one of the KPIs measures the percentage of the nurses' compliance in identifying patients before medication preparation. Other measures focus on monitoring changes in the outcomes such as the number of sentinel events. In other words, this model is applied to evaluate the influence of pursuing accreditation on both processes and ultimately outcomes.

Based on this model, making improvements to inputs and process will ultimately result in better quality outcomes which are applicable to the JCIA process. The quality department at KFHU made some adjustments to inputs by training staff and coordinating improvements to some of the hospital's facilities. Furthermore, enhancements were also made to processes by developing better policies and procedures that influence the providers' performance. An example of changes to inputs was decreasing medication errors by training nurses to comply with identifying patients during medication preparation. To meet that goal, the quality department organized campaigns to increase awareness amongst nurses across the hospital. Another example is making changes to processes to reduce

the patients' average length of stay (ALOS). To accomplish that goal the quality department encouraged the utilization of clinical pathways to standardize the patient treatment and management which ultimately led to a reduction to the ALOs.

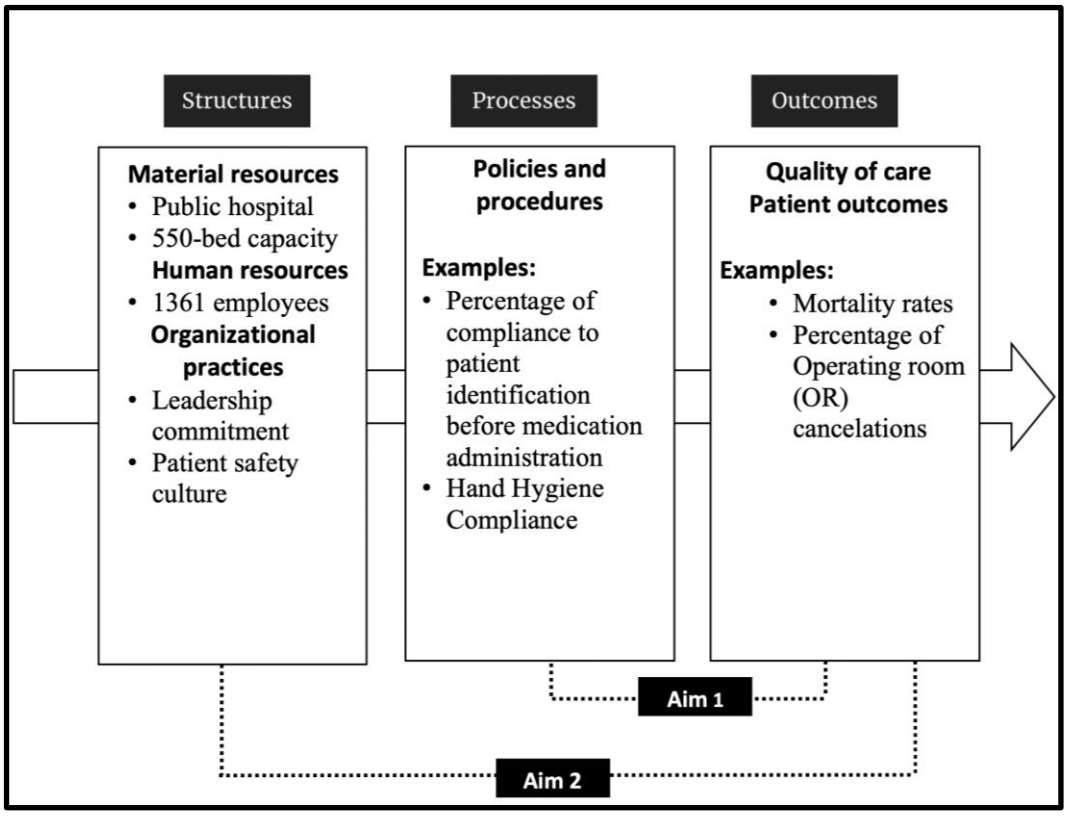

Figure 3.1: Donabedian Conceptual model

Study Population

KFHU is a public hospital that provided free health services to Saudi citizens and foreigners working in the public sector. The total number of employees working in both clinical and nonclinical departments was 1361 employees (345 permanent and 1016 contractors) including nursing staff, quality analysts, health providers, dietitians, Information Technology (IT) and administrative staff. Furthermore, the total number of patients visiting the ER and outpatient clinics was about 463,498 and over 20,627 patients were admitted in 2017. This research utilized a total of 12 Key Performance Indicators (KPIs) that measure the changes in quality processes and outcomes.

The KPIs were collected by the quality department each month from 10% of randomly selected discharged patients' medical records. In addition to medical records, data for each KPI is collected from other sources such as observations and the hospital's information system as seen in table 1.2.

Table 1.2: Data sources for each KPI

KPI*	Source	Reported by
1. Hand hygiene	Observation	Infection Control Unit
2. Nosocomial infections	Hospital Information System (HIS)	Infection Control Unit
3. Patient identification	Observation	Nursing Department
4. Radiology reporting	Hospital Information System (HIS)	Radiology Department
5. Lab critical reporting	Laboratory Monthly Records	Laboratory Department
6. Pressure ulcer	Occurrence variance report (OVR) and wound care records	Nursing Department
7. OR cancellations	Anesthesia Logbook	Anesthesia Department
8. Patients leaving ER without being seen	Hospital Information System (HIS)	Emergency Department
9. Mortality rate	Hospital Information System (HIS)	Decision Support Unit
10. Patient falls	Occurrence variance report (OVR)	Nursing Department
11. The average length of stay	Hospital Information System (HIS)	Case Management Unit
12. Bed Occupancy	Hospital Information System (HIS)	Case Management Unit

***KPI** refers to Key performance indicators

Statistical Analysis and Data Sources

Aim 1: To evaluate the impact of the JCIA process on a selection of quality improvement and patient safety JCI standards.

One of the main issues with using comparative designs and cross-sectional studies in measuring the impact of the JCIA is that they can only establish correlations between variables. This issue is due to the dynamic nature of the accreditation process that has both short term and long term outcomes. For that reason, an interrupted time series analysis (ITS) was used in this study to measure the impact of accreditation by dividing the regression into multiple posts and pre-intervention equal time intervals. ITS is a quasi-experimental design that uses a continued sequence of observations over a period of time, which are interrupted by an intervention, to establish a trend. (Shadish, Cook, & Campbell, 2002) (Bernal, Cummins, & Gasparrini, 2016) Moreover, it is also important to note that KFHU did not undergo drastic changes in organizational structure or other major interventions to improve quality during the study period which is helpful in limiting bias in the results.

The hospital's quality department collected the data that was used in this analysis. The data were collected retrospectively through a closed medical record review, observations, hospital information system, reports and other documents as seen in [Table 1, Appendix B]. The Medical Records Department prepares 10% of randomly selected discharged patient records each month to be reviewed by the quality department. The quality department's employees then calculate KPIs to monitor the level of compliance with the JCIA standards to track improvements in the quality of services. This study included data starting from the beginning accreditation preparation phase in January 2014 to data that will be collected during the second accreditation period in September 2018. In other words, the study period included a full accreditation cycle and the beginning of the second accreditation cycle three years post the first time the hospital was accredited. Data were collected by the quality department for each month throughout the process which is a total of 57 months for each quality measure included in this study. The frequency of data time

points enabled the researcher to detect any changes in each outcome. The outcomes include percentages, proportions, and averages as seen in [Table 1, Appendix B].

An interrupted times series segmented regression model was used. This approach enabled the researcher to estimate the constantly changing levels of compliance with JCI standards while controlling for changes that might occur outside of the intervention. (Wagner, Soumerai, Zhang, & Ross-Degnan, 2002) Furthermore, there is a total of 12 quality measures in this study [Table 1, Appendix B]. The study includes measures that are not specific to a specialty or a disease. Lastly, due to the large number of outcome measures, the Bonferroni correction was used to adjust for the p-value and to decrease the risk of an inflated type I error. (Armstrong, 2014)

The following is the interrupted times series segmented regression model:

$$Yt=\beta_0+\beta_1* time_t+\beta_2* intervention_t+\beta_3* time\ after\ intervention_t+ e_t$$

- **Y_t** refers to the outcome which was measured using a KPI for each measurable element of a JCI standard in this study.
- **$_t$** is time in months at $time_t$ starting from the start of the observation period on January 2014 to the last time point in the series on September 2018.
- **Intervention** refers to the formal survey conducted by JCI surveyors that resulted in officially accrediting the hospital in September 2015. It is a measure for $time_t$ and it is a binary variable which is recoded into 0= is for the time occurring before interventions and 1 after the intervention.
- **time after intervention** is a continuous variable with the number of months post-intervention at $time_t$.
- **β0** is the baseline level of the outcome at the start of the time series.
- **β1** is the slope prior to accreditation (i.e. the baseline trend).
- **β2** is the level change after the intervention.

- **β3** is the difference in the slope from pre to post accreditation.

- **e** stands for the random error term.

The regression model was used to estimate the trend and the level of the dependent variables, the various quality outcomes, before and after the intervention. The independent variable is time which is interrupted by the intervention. The results were analyzed by interpreting both the level change directly after the intervention (B_2) and the change in slope after the intervention (B_3). The changes in the level and slope were used to estimate the increase or decrease in each quality outcome. The results for each KPI were reported individually and categorized into process and outcomes measures.

The total number of KPIs collected by the hospital was 113, nevertheless only 12 of those measures were selected for this study. The reason these measures were selected was based on exclusion criteria. The first criterion led to the exclusion of measures that were not directly related to the quality of health services or patient safety such as facility management and laundry services related measures. The first criterion excluded a total of 17 KPIs. The second exclusion criterion included measures that were related to a specific specialty or department such as pediatrics and cardiology to ensure that the measures were applicable to most patients treated at the hospital. Based on the second criterion, a total of 40 KPIs were excluded which reduced the total to 56 outcomes. A total of 29 KPIs that were not recorded throughout the period of study were also excluded. Based on this criterion, any measures that were not collected pre, during and post accreditation were omitted from the study which reduced the total to 27 KPIs. Furthermore, any indicators that were not collected every month were also excluded such as the percentage of employees aware of the hospital's safety management plan which was only measured quarterly thus reducing the total to 14 outcomes. Lastly, KPIs that had issues with their face validity were not included. For instance, if the source of the data collected for the measure was not verifiable or subject to bias were excluded which resulted in a total of 12 measurable outcomes.

Chapter 4: Methodology for the Qualitative Analysis

Conceptual Model

Aim 2: To investigate the attitudes and perceptions of health professionals towards the overall JCIA process and to identify factors that facilitate its implementation.

The Donabedian model was selected as a framework for the qualitative data collection and analysis. This paradigm was selected because it acknowledges the three dimensions of health care instead of merely focusing on the changes in outcomes. This is applicable to the JCIA process since it impacts all dimensions of care including structures, processes, and outcomes. [Figure 3] The qualitative research questions were designed based on this paradigm to ensure that health providers provided their insights on each dimension of care. (Iles, 2006, pp.199) When it comes to structures, participants were able to provide insights on not only material resources but on leadership commitment and patient safety culture and other aspects of inputs that were not measured using quantitative methods.

As for processes, data was collected on the perceived changes in the behaviors of health providers impacted by the accreditation process. Changes to this dimension of care were the focus of the JCIA since its goal was to enhance health practices to ensure the compliance with international standards of care and patient safety. Lastly, qualitative data was also collected on the perceived impact of the intervention on outcomes. Quality outcomes refer to the end results of the health care delivery process such as mortality rates and nosocomial infections which is influenced by changes in both inputs and processes.

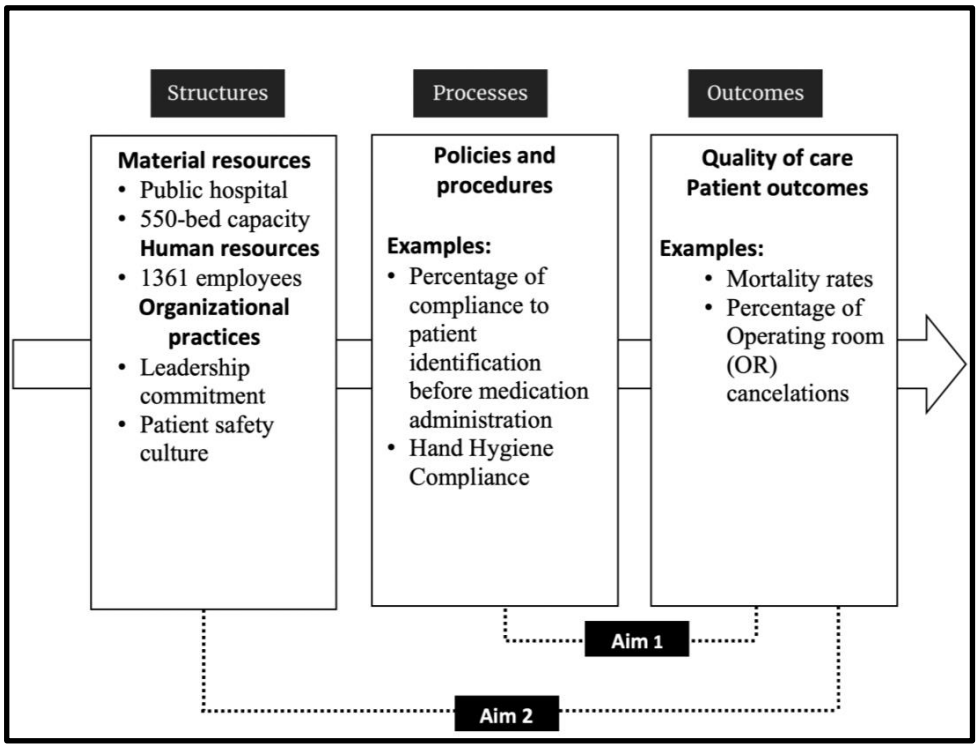

Figure 3.2: Donabedian Conceptual model

Study population

The total number of participants in the qualitative data collection was 31 and it was comprised of different categories of employees and health providers. The categories of participants included 1) nurses, 2) physicians, 3) administrative staff and 4) other types of providers such as radiologists and lab technicians. A breakdown of the participants and their categories are demonstrated in Table 4.1.

The potential participants were identified either directly by the researcher, the quality department, the department heads or by other participants. The first step of the participant recruitment process was compiling a list for each type of provider included in this study and contacting them in multiple ways. The first approach was by directly emailing or calling the potential participants to set up an appointment to meet. If the response rate was low, the participants were contacted through a quality department employee or by requesting that the department head sends an official letter to request the participants' cooperation in this study. Depending on the interviewee's request or time restrictions, they were assigned to a focus group or an individual interview. No incentives were provided to participants to partake in either focus groups or interviews.

Table 4.1: Breakdown of participants

Category	Number of participants	Breakdown of participants
Administrative staff	12	8 Quality department staff members 3 IT department employees 1 medical record department head
Nurses	7	7 nurses from all levels/specialties
Physicians	5	5 Physicians
Other health providers	7	3 pharmacists 3 lab specialists 1 radiologist

Qualitative Data Collection and Analysis

A qualitative analysis was used to investigate the attitudes and perceptions of health professionals towards the JCIA, their perceived changes due to the process and their recommendations for improvement. The researcher collected data by using both focus groups without any assistance. A total of five individual interviews and 4 focus groups were conducted which were all conducted in English and were audio recorded with the participants' consent. If a participant requested not to be recorded notes were taken by the researcher. A break down of the participants of each focus group and interview are listed in Tables 4.2 and 4.3. Focus groups were conducted with employees from the same category to ensure that they are to express their point of view honestly. Focus groups were useful in providing the perspectives of each category of employees in general and the data collected provided more comprehensive information on how the JCIA relates to their work. Individual interviews were conducted to allow some participants from the focus groups to elaborate on some of their answers or as a result of scheduling conflicts that prevented them from participating in focus groups.

Table 4.2 Breakdown of focus groups

Type of participant	Number of participants
Quality department employees	8
Information Technology (IT) department employees	4
Lab specialists	3
Nursing staff	8

Table 4.3 Breakdown of individual interviews

Type of participant	Number of individual interviews
Quality department employees	4
Nursing staff	2
Physicians	5
Radiologist	1
Pharmacists	3

The qualitative data design used was the Grounded Theory (GT) which is a form of content analysis. This approach analyzed data by using codes to create categories and subcategories and linking them together to create a theory. The aim of coding is to identify themes in data that relate to key concepts in this study. By using transcripts from interviews and focus groups data were first coded into open codes that identified different categories such as the factors that impact the JCIA. The categories were then divided into sub-categories using axial codes that are more specific. [Table 2, Appendix B] For instance, factors identified were then divided into individual factors such as the provider's resistance and the increasing workload. The qualitative analysis was conducted soley by the researcher using the software NVivo. After the themes were identified, the connection between them was investigated and a theory regarding the factors influencing the accreditation process emerged [Figure 5.1]. (Allan, G., 2003)

Unlike quantitative studies that are concerned with the validity, qualitative research is concerned with the truthfulness or the trustworthiness of data. For that reason, the Triangulation method was used to ensure the accuracy of qualitative data. Triangulation is a powerful method used to validate the research data through double-checking results to increase its credibility. (Bogdan & Biklen, 2007) There are multiple types of this approach, however, this study utilized Theory triangulation. This approach refers to collecting data from different categories of stakeholders involved in the process. Collecting data from different types of employees and health providers ensured that information is collected from a variety of professional perspectives. Transcripts from different focus groups were compared to establish the legitimacy of the findings (Guion, 2002) The rationale for using a qualitative approach is the fact that literature on this topic is relatively limited; therefore, this method allows the researcher "greater freedom to explore the research area and allow issues to emerge." (Jones & Alony, 2011, p.3) The focus groups were then divided by type of provider and individual interviews were scheduled to ensure that the participants can provide feedback regarding their specific role in the accreditation process or how it impacted their work.

Due to the tight schedules of health providers, each focus group and interview ranged from 35 minutes to 90 minutes with some follow up interviews after the focus groups with individual participants. The follow-up interviews were conducted if there was a time limit during the focus group or to allow participants to elaborate on certain points they had discussed. These follow up interviews were conducted individually in person or via phone. A moderator's guide was used to guide interviews and focus groups and was used to introduction of the topic of this study to the participants. The questions asked during interviews and focus groups were customized based on the type of provider and based on each participant's experience and involvement in the JCIA process. The moderators guide also includes a list main interview and focus group questions with some of the different prompts used by the researcher. [Appendix C]

Each participant was asked to complete consent forms prior to conducting the focus group or interview. As shown in [Appendix C], the consent forms included information on the study and its aims, instructions, confidentiality statement and the risks and benefits to research participants. Moreover, a signup sheet was provided which was used to collect basic information on the participants such as their qualifications, and their contact information for any follow-up questions. Lastly, the researcher also explained the purpose of the study and explained the process for participants who were unfamiliar with focus groups.

Chapter 5: Research Findings

Introduction

The quantitative and qualitative results are reported separately in this chapter. The quantitative results are displayed in a summary table [Table 5.1] followed by the interpretation of the results. The table is followed by a total of 12 diagrams to better describe the details of the patterns in each outcomes measure.

The results for each KPI were interpreted using the following:

- Intercept (β0): The intercept refers to the baseline level of the outcome at the start of the time series.
- Baseline trend (β1): Is the slope prior to accreditation which refers to the change in the outcome every month up to the day of the intervention.
- Intervention (β2): The level change during the month of the intervention which is the formal survey conducted by the JCI in September 2015 (the 22nd month in the time series).
- Change in slope (β3): The difference in the slope from pre to post accreditation which shows the sustained effect of the intervention.

As for the qualitative results they are reported in tables 5.2, 5.3, 5.4 and 5.5 and are categorized by the open and axial codes identified during the analysis. The open codes are based on the main research questions in aim 2, they include the factors that impact the accreditation, the perceptions of health providers towards this process and their recommendations for improvement. The table was then further classified by axial codes which refer to the breakdown of each theme in the open coding into subcategories. Lastly, the mixed results were interpreted and presented in the discussion section of this chapter to present the relationships, contradictions, and context for both quantitative and qualitative results.

Quantitative Results

As seen in Table 5.1, only six out of 12 outcomes had a statistically significant pre-accreditation slope (β1) when considering the Bonferroni critical value. The pre-accreditation slope suggests that the preparations for the accreditation survey, which started in January 2014, lead to statistically significant improvements in the percentage of hand hygiene compliance, nosocomial infections, and the percentage of radiology reporting turnaround time outliers. On the other hand, during the preparation for the accreditation there was a monthly increase in mortality rate and pressure ulcer rate. Furthermore, there was almost no change in the post-accreditation slope when it came to the percentage of laboratory critical values reporting within 30 minutes, which already had a compliance rate of 99.37%. [Table 5.1]

As for the improvement in level (β2), only the average length of stay had a statistically significant improvement, which was decreased by an average of 2.44 days. This suggests that the intervention had an immediate impact on the average length of stay. Conversely, there was a statistically negative impact on the level of two outcomes: the nosocomial infections, and the rate of patients leaving the ER without being seen. Furthermore, there was slight improvements in the level of the percentage of laboratory critical values reporting within 30 minutes and the percentage of the radiology turnaround time outliers.

The change in slope(β3), which measures the sustained change in the post-accreditation period, showed a statistically significant improvement every month in the percentage of hand hygiene compliance, pressure ulcer rate, and mortality rate in the three years following the accreditation survey (2016, 2017, 2018). The percentage of laboratory critical values reporting within 30 minutes showed no additional improvements. Nevertheless, this lack of improvement is due to the already high compliance of reporting lab critical values within 30 minutes.

Furthermore, the results indicate that lab reporting compliance was maintained at 100% post-accreditation compared to the baseline trend, which can be considered a positive residual impact of accreditation. On the other hand, there was a negative sustained impact on the rate of patients leaving the ER without being seen.

Figures 5.1 to 5.12 illustrate the patterns for each outcome to better describe the changes throughout the period of study. Each graph is followed by a more detailed description of the changes pre- and post-intervention for each outcome.

Table 5.1: The impact of accreditation on a selection of quality measures at King Fahd University Hospital

KPI*	Intercept (β0)		Baseline trend(β1)		Intervention (β2)		Change in slope(β3)	
	value	*P*-value	Value	*P*-Value	Value	*P*-value	value	*P*-value
Hand hygiene compliance†	41.08	*P*<.001	1.5	*P*<.001	↓-3.09	0.32	↑0.18	*P*<.001
Nosocomial infections¶	2.84	*P*<.001	-0.12	*P*<.001	↓2.56	*P*<.001	↓-0.05	0.03
Patient identification†	59.9	*P*<.001	2.3	.03	↓-4.23	0.54	↑0.11	0.03
Radiology reporting†	78.37	*P*<.001	-5.45	*P*<.001	↓23.12	0.03	↓0.34	0.18
Lab reporting†	99.37	*P*<.001	0.03	*P*<.001	↓-0.32	*P*<.001	0	*P*<.001
Pressure ulcer¶	0.12	0.58	0.09	*P*<.001	↓1.14	0.01	↑-0.04	*P*<.001
OR cancelations†	45.32	*P*<.001	-0.10	.90	↓7.20	0.44	↓0.19	0.62
Patients leaving ER without being seen §	228.14	*P*<.001	-1.27	.68	↓257.48	*P*<.001	↓9.11	*P*<.001
Mortality rate§	11.51	*P*<.001	1.43	*P*<.001	↑-3.34	0.38	↑-0.51	*P*<.001
Patient falls¶	0.79	*P*<.001	0.01	.55	↓0.01	0.97	↓0.01	0.33
Average length of stay¶	7.62	*P*<.001	0.17	.01	↑-2.44	P<.001	↓0.01	0.72
Bed Occupancy †	63.25	*P*<.001	-0.04	.86	↓3.54	0.31	↑-0.12	0.20

*KPI refers to Key performance indicators
P ≤ 0.004 is considered significant using the Bonferroni correction
† Indicates that a KPI is expressed in percentages
§ Rate per 10000 patients
¶ Rate per 1000 Patients' Days
↑ Indicates that the outcome improved whether it was an increase or a decrease
↓ Indicates that the outcome did not improve whether it was an increase or a decrease

1. Percentage of hand Hygiene compliance

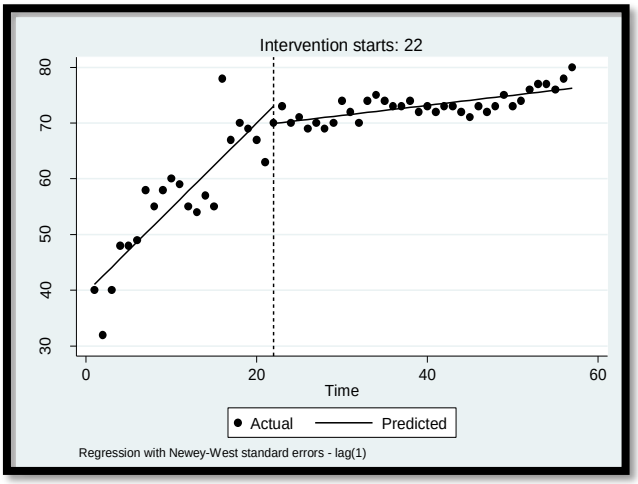

Figure 5.1: Time series graph of the percentage of hand hygiene compliance before and after the intervention

As seen from figure 4, the percentage of hand hygiene compliance at the beginning of the study period in January 2014 was 41.08%, and it appeared to increase prior to the intervention period by 1.5% a month. Furthermore, during the month of the intervention, which was in September 2015, there was a 3.09% decrease in hand hygiene compliance. Lastly, the change in post-accreditation slope indicates that there was a mere 0.18% sustained increase in compliance after the intervention.

2. Rate of nosocomial Infections

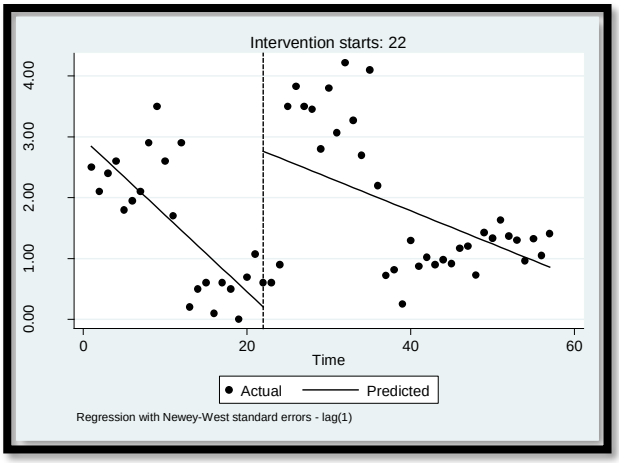

Figure 5.2: Time series graph of the rate of nosocomial infections before and after the intervention

The starting level of the rate of nosocomial infections was 2.84, and it appeared to decrease prior to the intervention period by 0.12 a month. During the first month of the intervention, there was a 2.56 increase in nosocomial infections that was later followed by a 0.71 increase per month after the intervention period. After the accreditation was received, the sustained decrease in the nosocomial infection rate was only 0.05 per month.

3. Percentage of correct identification of patients during medication preparation

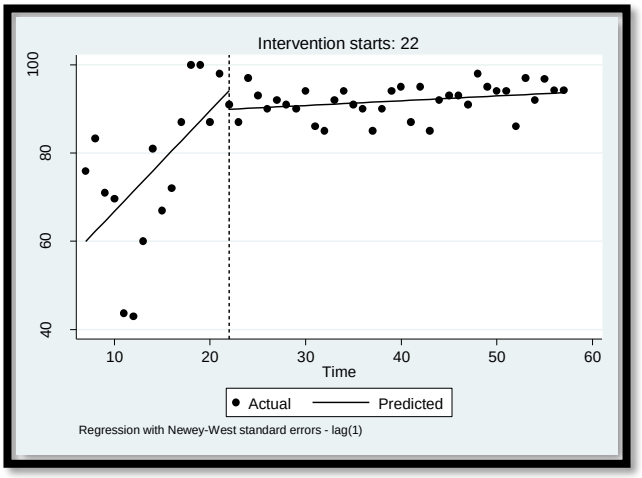

Figure 5.3: Time series graph of the percentage of patient identification before and after the intervention

The compliance with the correct identification of patients prior to administrating medication by nurses was 59.95% at the beginning of the study period. The compliance appeared to increase prior to the intervention period by 2.3% a month. During the first month of the intervention, there was a 4.24% decrease and It was followed by a 2.2% decrease a month after the intervention period. However, according to the post-accreditation trend, there was a very small sustained increase in compliance by 0.11% a month.

4. Percentage of Radiology report turnaround time outliers

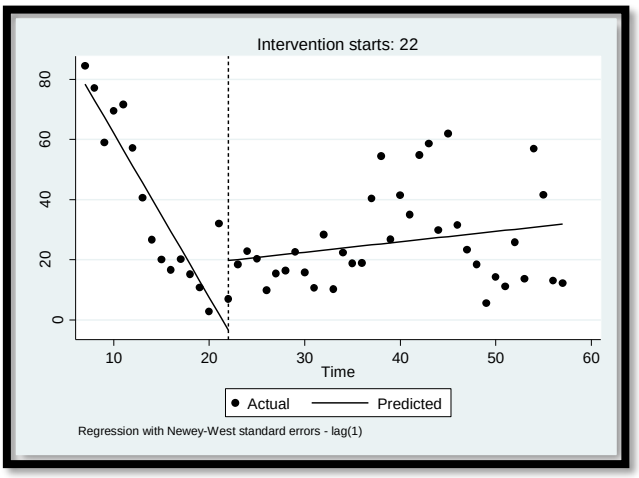

Figure 5.4: Time series graph of the rate of radiology turnaround time outliers before and after the intervention

The radiology report turnaround time outliers were at 78.37% at the beginning of the study period and it appeared to decrease prior to the intervention period by 5.45% each month. Furthermore, at the month of the intervention, there was 23.11% increase in radiology report turnaround time, and it was followed by a 5% increase a month after the intervention period. However, there was a 0.34% sustained decrease after the intervention.

5. Percentage of laboratory critical values reporting within 30 minutes

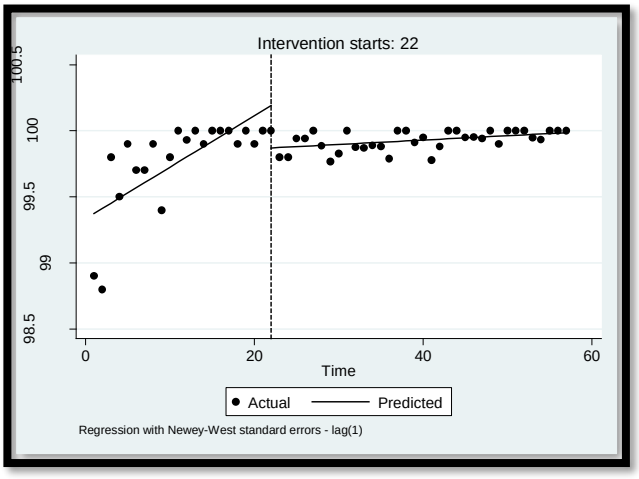

Figure 5.5: Time series graph of the percentage of laboratory critical values reporting before and after the intervention

At the start of the study period, the percentage of the reporting of laboratory critical values within 30 minutes was 99.37% and it increased each month prior to the accreditation survey by 0.03%. Moreover, during the first month of the intervention, there was a 0.32 decrease the lab reporting of critical values and no change in the post-accreditation slope which means that the improvement was maintained post accreditation.

6. Pressure Ulcer Incidence rate per 1000 Patients' Days

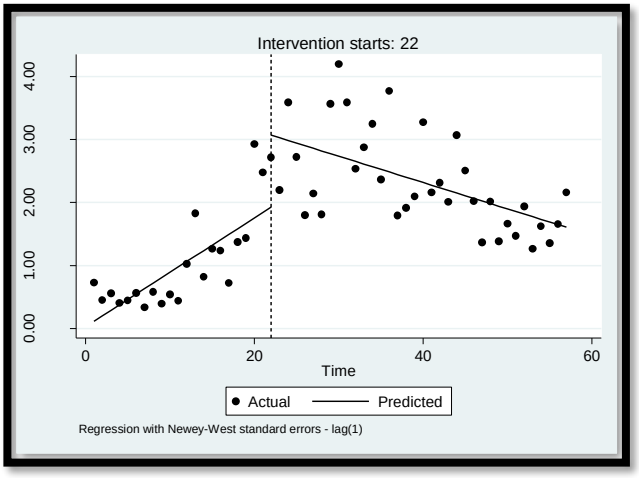

Figure 5.6: Time series graph of the pressure ulcer incident rate before and after the intervention

During the first month of the intervention the pressure ulcer rate was 0.14 and there was a monthly increase prior to the intervention by 0.09. During the month of the accreditation survey, there was a 1.14 increase in the incidence rate, and it was followed by a 0.13 decrease a month after the intervention period. Lastly, after the accreditation was received there was a there was a 0.04 sustained decrease in the pressure ulcer rate.

7. Percentage of Operating Room (OR) cancelations on the day of a procedure

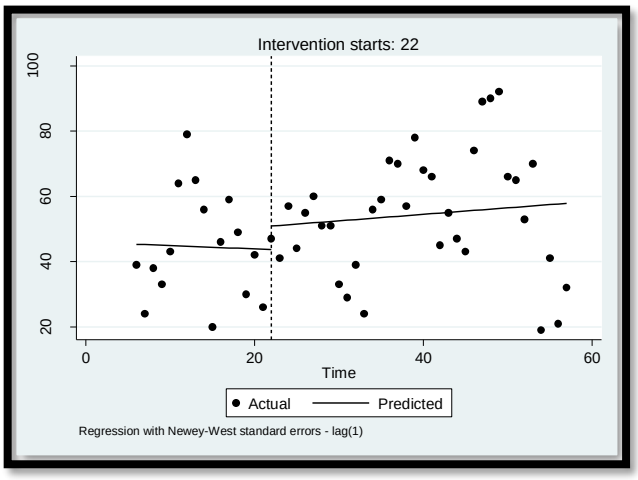

Figure 5.7: Time series graph of the percentage of OR cancelations before and after the intervention

Same day OR cancelation were at 45.32% prior to the intervention and it decreased prior to the accreditation by 0.1% a month. During the month of the accreditation survey, there was a 7.2% increase in cancelations, and it was followed by a 0.3% monthly increase after the intervention period. Furthermore, there was a 0.19% monthly sustained increase in cancelations. Therefore, we can conclude that the accreditation process did not seem to successfully reduce the rate of OR cancelations.

8. Rate of patients who left the ER without being seen per 10000 patients

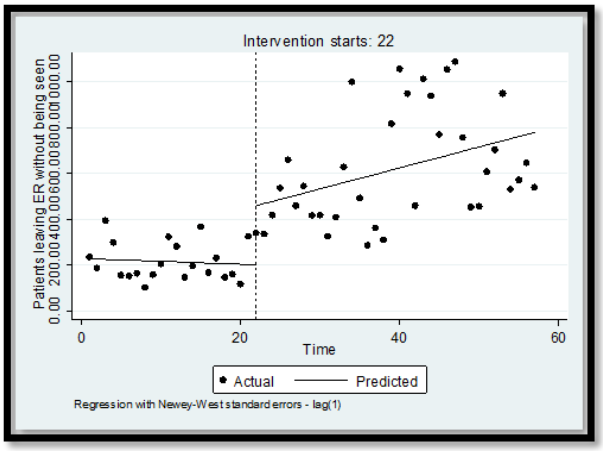

Figure 5.8: Time series graph of the number of patients leaving the ER without being seen before and after the intervention

The rate of the patients who left the ER without being seen when the study period began was 228.14 and decreased prior to the intervention period by 1.27 a month. Immediately after the accreditation survey, there was 257.48 increase in the rate of patients leaving the ER, and it was followed by a 10.38 monthly increase after the intervention period. Furthermore, the post-intervention linear trend showed that there was a sustained increase in the rate of patients leaving the ER by 9.11 monthly. These results indicate that the accreditation process did not successfully reduce the number of patients who left the ER without being treated.

9. Mortality rate

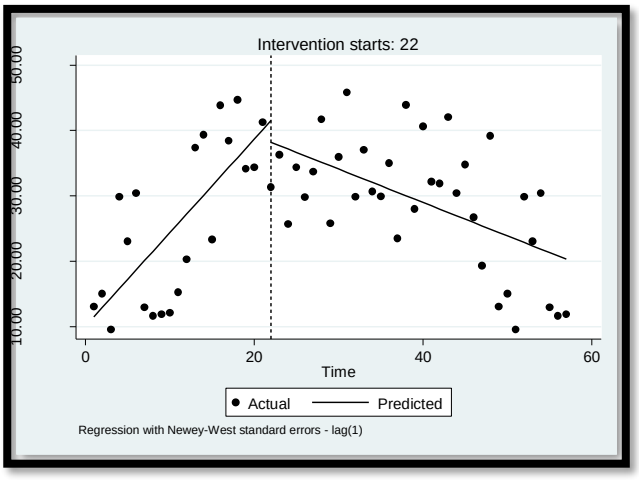

Figure 5.9: Time series graph of the mortality rate before and after the intervention

Initially, the patient mortality rate was 11.51 and it appeared to increase prior to the intervention period by 1.43 a month. During the first month of the intervention, there was a 3.34 decrease in the mortality rate, and it was followed by a 1.94 monthly decrease after the intervention period. Lastly, there was a 0.51 sustained decrease in mortality rates after the intervention according to the post-intervention linear trend.

10. Rate of Patient falls per 1000 patient days

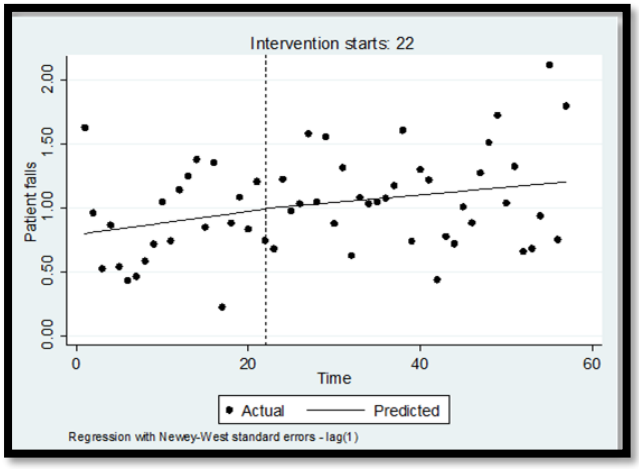

Figure 5.10: Time series graph of the rate of patient falls before and after the intervention

The rate of patient falls was 0.79 at the beginning of the study period and it increased each month up to the accreditation month by 0.01. During the first month of the intervention, there was merely a 0.01 increase in the rate of patient falls per 1000 patient days and it was followed by a 0.01 decrease monthly. There was also a 0.01 sustained increase every month post-intervention.

11. The average length of stay (ALOS)

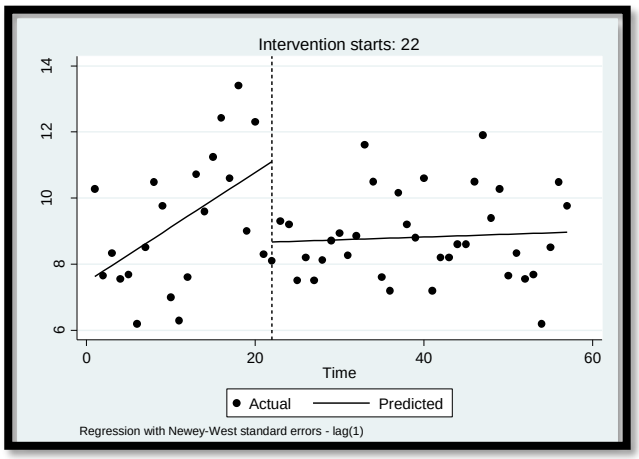

Figure 5.11: Time series graph of the average length of stay before and after the intervention

The ALOS was initially 7.62 on at the start of the study period and it increased prior to the intervention period by 0.17 a month. During the month of the intervention, there was a 2.44 decrease in the ALOS and it was

followed by a 0.16 monthly decrease after the intervention period. After the accreditation was received in September 2015, there was a sustained increase of 0.01 a month.

12. Bed Occupancy

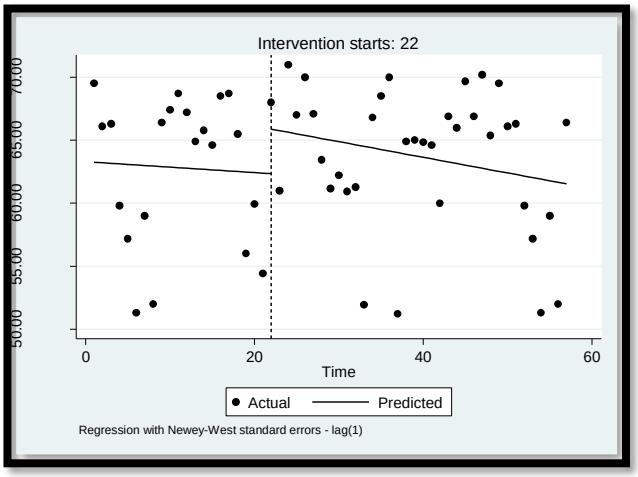

Figure 5.12: Time series graph of the rate of patient falls before and after the intervention

During the first month of the study period, the bed occupancy was 63.25% and it decreased prior to the intervention period by 0.04 a month. Moreover, during the month of the intervention, there was 3.54 increase and it was followed by a 0.08 monthly decrease post-intervention. As for the post-intervention trend, it showed a 0.12 decrease.

<u>Overall interpretation of ITS graphs:</u>

The impact of an intervention on ITS may have immediate, lagging, or a combination of effects. An immediate change is reflected in the change of level immediately after the intervention (β2) and a lagged improvement is observed by the gradual change in slope (β3). This variation in the effects can be caused by how fast an outcome responds to the intervention. (Bernal, Soumerai, & Gasparrini, 2018) Regardless of statistical significance, the graphs suggest that 9 out of 12 outcomes were improved throughout the accreditation process. Each outcome is categorized by the type of improvement in Table 5.2 below. As for outcomes that were negatively impacted by the accreditation, they include the rate of patient who left the ER without being seen, the percentage of OR cancelations and the rate of patient falls which both seemed to have both immediate and lagged increase.

Table 5.2 Types of positive impact of the JCIA on outcomes

Type of improvement	Outcomes
Immediate (1)	The average length of stay
Lagged (7)	Hand hygiene compliance Nosocomial infections Radiology reporting Pressure ulcer Correct patient identification Critical lab reporting Bed occupancy rate
Immediate and lagged (1)	Mortality rate

Qualitative Results

A total of 31 participants were included in this study. The participants discussed their perceptions of the impacts of the JCIA process on the overall performance of the hospital, or certain quality outcomes, and the behaviors of the leadership and employees. The participants' responses were categorized into three main areas, namely: perceptions of the accreditation process, factors that influence its success in improving quality, and their recommendations for improvement.

The Perceptions of Providers Towards the Accreditation Process and its Impact

As seen in Table 5.3, the participants' responses indicate that there were nine areas that were improved due to the accreditation process. A total of five health providers believed that the quality improvement training and education at the hospital improved. For instance, one participant stated that the nurses' knowledge about patients' rights and patient safety improved drastically due to the JCIA process. Other interviewees stated that meeting the JCI standards resulted in a reduced amount of paperwork. This was since the hospital administrators were encouraged by the JCI to merge duplicate forms into one. Examples of merged forms include consent forms that were condensed from six forms into a couple of forms and the multidisciplinary notes that were created instead of separate progress notes for each type of provider.

Furthermore, some participants noticed some improvement in quality outcomes especially when it came to the reduction of medication errors. However, a greater number of participants believed that the JCIA mostly improved process, policies, and procedures and not merely outcomes. For instance, one participant stated that each department had its own IV administration process but in order to meet the JCI's standards they improved and standardized the process in all departments. Moreover, two participants believed that the JCIA may not have improved quality entirely, but it streamlined the health quality improvement process and organized it making it easier to follow. Lastly, one participant emphasized the influence the accreditation process had on making the leadership more engaged with stakeholders and those involved in improving the quality of services provided at the hospital.

Table 5.3. The perceived positive impact of the JCIA* process

Theme	Sample quote
Training and education (5)**	"So the education of nurses improved, the nurses' skills improved. They are more informed about their rights and patients' rights the change is clear."
Reduced paperwork (4)	"The consent policies, before we had a lot of patient consent forms maybe six or seven consent forms. After the JCI they made them into two forms with the administration."
Improved quality and patient safety (4)	**"**for the international patient safety goals which is the most important one is we are 100% compliant."
Organization and monitoring (2)	"I think the JCI just put everything together, so it made it more organized and easier to be monitored."
Leadership (1)	"…by forming committees and through teamwork and tasks forces and most of these committees are involved with the hospital's leadership or the hospital's director."
Improved processes (9)	"That is what we call the standardization of this and this is the benefit that we got from the JCI."
Improved organizational culture (4)	"People are talking about KPIs talking about sentinel events reporting. The culture of safety, risk management. so all of these things were not practiced much before the JCI and now people are now curious to know about it."
Improved awareness (2)	"…and people understand more what's quality and how it will affect their performance and the patients' safety."

*Joint Commission International Accreditation

**The number of participant responses is indicated between parenthesis

On the other hand, the interviewees mention seven main negative impacts of the accreditation process. The most commonly mentioned negative impact associated with the JCIA was the increased workload. A total of seven participants believe that meeting the JCIA standards drastically increased their workload and they had to meet the standards in a short period of time. According to some participants, the sudden additional workload to become

international accredited distracted them from their primary job which is patient care. For instance, one participant agreed by stating “yes, I think they are making us focus more on the paper than patient care.”

Nevertheless, one nursed was hopeful that this increased pressure is temporary and will lead to a more efficient way to use the health providers’ time. She gave an example of how the transfer from paper documentation to a fully electronic system was time-consuming, however, it could lead to faster and more efficient documentation in the future. Furthermore, the additional workload leads to some resistance from providers who expressed this as another area of concern. To address this issue, a total of six participants stated that the hospital’s leadership enforced compliance in the efforts to meet international standards. For instance, an employee stated that physicians were directly asked by the hospital’s president to complete a great number of incomplete medical records in just a few days.

Another main issue was the lack of enough quality improvement training especially when it came to educating health providers on international accreditation. Even though the hospital did offer some quality improvement workshops and educational sessions, there were some areas that still needed to be explained. One employee stated that “they didn’t enough help from the JCI in order to select the most appropriate KPIs. She stated that the JCI merely gave them some hints on what direction to go to select them.”

Six participants stated that, even though there were many improvements caused by the JCIA process these improvements were not sustainable. The participants did not believe they were sustainable because health providers mostly complied during the official JCI survey because they were motivated to receive the accreditation as opposed to improving quality in the long run. In other words, the goal of receiving the JCIA may have produced a Hawthorne Effect which refers to how individuals temporarily modify their behavior as a result of being aware that they are being observed. (Mccarney, et al. 2007)

Three participants also expressed concerns that the accreditation process might cause some misconceptions as a result of the misinterpretation of data. One participant provided an example of how "the increase of OVRs [Occurrence variance reports] can be misunderstood as an increase in sentinel events, however, it is actually a good sign because it means more people are reporting them and not that they occur more often." The increase of OVRs was a direct result of the attempts to meet one of the JCIA's standards that recommends the report of any sentinel events that occur at the hospital. According to the JCIA, sentinel events refer to any "unexpected occurrence involving death or serious physical or psychological injury, or the risk thereof. Serious injury specifically includes loss of limb or function."

Three responses suggest that another concern was the lack of proper communication both from the leadership and between employees at all levels. Some employees felt that it was difficult for them to communicate their needs to other departments and that they were directly involved in the JCIA process, especially when it came to the Medical Records department. Lastly. two participants expressed concerns that there is more focus on improving the process instead of improving structures, and patient and quality outcomes. An example that was mentioned of a structure that needs to be documented and improved is the physician-patient ratio.

Table 5.4. The perceived negative impact towards the JCIA* process

Theme	Sample quotes
Increased workload (7)**	"…the amount of work increased a lot and they want a lot of things in such a short period of time." "yes, I think they are making us focus more on the paper than patient care"
Use of sanctions and mandating compliance (6)	"…the more sanctions they use on staff and providers the more they don't comply with JCI related work which has a negative impact on participation and incentives should be used instead." "physicians were pressured to complete medical records by getting direct orders from the presidents to go to a conference room to complete piles of records within a short deadline"

Resistance from providers (6)	"This created confusions and resistance and even some of the work was given to residents to complete by physicians" "physicians were pressured to complete medical records by getting direct orders from the presidents to go to a conference room to complete piles of records within a short deadline"
Lack of education (3)	**"**I think maybe the only negative impact is that people didn't know much about it. there wasn't much education before starting the JCI and I think the time for the institution to prepare for the JCI is very short..."
Lack of sustainability (6)	"We have a problem in the sustainability of the compliance and of the old staff regardless such as doctors because they will only do it at the moment of the JCI and after they go [the JCI surveyors] it will relax again."
Lack of proper communication (3)	"Instead of forming meetings with a medical record committee with reps from different departments we actually visit each department to ask them for information, there needs to be a better way to communicate their needs"
Focus on improving process alone (3)	"One issue is that most KPIs measure the changes in the processes. Or the policies and procedures we need to follow. There needs to be more measurement of how that impacts quality and patient outcomes so that we can have a better idea of the improvements in the long term
Misinterpretation of Data (3)	"For example, the increase of OVRs can be misunderstood as an increase in sentinel events, however, it is an actually a good sign because it means more people are reporting them and not that they occur more often."

*Joint Commission International Accreditation

**The number of participant responses is indicated between parenthesis

The Factors Influencing the Effectiveness of the Accreditation Process

Overall, the responses suggest that there were nine main perceived factors that impact the effectiveness of the JCIA process on the overall quality of services provided at KFUH. (Table 5.4) The majority of responses indicate that the increasing workload may hinder the effectiveness of the JCIA process in improving and sustaining quality. For instance, according to a participant from the pharmacy department, the JCI surveyors suggested that Intravenous therapy (IV) should be prepared by pharmacists, not nurses as was done before. As a result of that change, there was sudden increased pressure on the pharmacy department, however, the did not have enough staff to deal with the increased load and they had to operate 24 hours a day.

The participants also believe that there was a greater focus on improving processes to meet the JCIA demands instead of working on other components of quality such as structures and outcomes. Study respondents suggested that more health providers are needed to meet the increasing demands of meeting the JCIA standards and to improve quality. For instance, one participant mentioned the patient-staff ratio as an example of an important component of a structure needed to be measured to improve quality.

Another potential barrier is provider resistance towards changes required to meet the accreditation requirements. Resistance to change refers to either an action or lack thereof towards a change in the environment. (Bolognese, 2002) Several participants believed that most of the resistance came from physicians who wanted to focus on the clinical and patient care aspects of their jobs. One of the main causes of their resistance was the increased need for documentation that goes beyond the patients' medical records. Physicians and other health providers were reluctant to report various quality outcomes that were requested by the quality department. The data requested by the quality department is crucial to measure different quality outcomes using KPIs. Without sufficient data, it would be difficult to identify any issues regarding areas of improvement which may jeopardize meeting the JCI's standards.

Incentives were also mentioned as a great approach to motivate health professionals to be involved in improving the quality of services and meeting the JCIs standards. Several participants, including nurses and quality improvement personnel, expressed their displeasure with the lack of incentives to compensate them or reward for their efforts. They believe that any incentives don't have to be monetary and any type of recognition or award would increase staff morale and an increased in the number of providers participating in the quality improvement process.

The sixth factor mentioned is the lack of proper education and awareness when it comes to quality improvement. Even though some workshops and training sessions were offered, such as workshops on the use of Six Sigma, some participants felt that more topics in relation to international accreditation and quality improvement should be covered. More specifically, several interviewees stated that there was no introductory course or orientation

about the JCIA to explain its goals and benefits to increase awareness and decrease resistance. Other topics that were not covered by training sessions included: risk management, patient safety, and overall performance improvement.

According to all types of health providers, the hospital's leadership plays a crucial role in ensuring the success of meeting the JCI's standards. Several physicians and quality improvement employees stated that, due to the organizational culture of the hospital, one of the only ways to ensure the compliance of employees on all levels is for them to get direct orders from the hospital's president. One physician stated that "…it's like raising a child so sometimes in the eyes of the child they don't know what's good or bad for them. So it's good to have a different eye, to help them know what is right and what is wrong." To illustrate this point, the physician gave an example of how the leadership overcame the resistance due to the increased workload by emphasizing to them that this will be beneficial to them, the patients and the hospital in the long run. Additionally, some interviewees expressed concern regarding the lack of effective commination between personnel and the hospital's administration which caused a lack of awareness and some difficulty understanding each department's issues and needs. This was emphasized by medical record employees who expressed that they did not feel represented and were not a part of any meetings with the quality department regarding the JCIA. For these reasons, the role of the organization's top leadership is critical especially when it comes to getting the cooperation of department's heads, who, in turn, motivate their employees towards the common goal of getting accredited.

Another factor is the organizational culture, especially when it comes to attitudes towards accreditation. Some nurses stated that some physicians and other health providers perceive quality improvement as an additional load and would rather focus on the clinical aspects of the job. The nurses stated that this attitude should change and that awareness should be brought to this issue to ensure that all health providers view quality improvement efforts and patient safety as crucial parts of their jobs, and remind them that meeting the JCIA standards actually align with the mission and vision of the hospital.

Lastly, time limitation was a big barrier that was reported by two physicians. The two physicians stated that having enough time to prepare for the accreditation is vital, since it takes a long time to change the culture of the hospital that might be resistant to such a big change. They also stated that more time is needed to truly see if the JCIA causes long-lasting improvements in quality and patient outcomes.

Table 5.5. The perceived factors influencing the effectiveness of the JCIA* on improving the quality of services at King Fahd Hospital

Theme	Sample quote
Workload (14)**	"to compensate the extra workload there should be enough staff. "
Improving the hospital's structure (4)	"…and one of the structures that we have to focus on is the patient-staff ratio, these are a part of the nursing indicators."
Resistance from providers (8)	"From my point of view, that is the reason why we are having the problem even in the transition from paper-based to electronic we find that the participation of the physicians is less compared to the other departments."
Use of incentives (16)	"an incentive like employees of the month if money was a problem"
Education or training in quality improvement (14)	"I think they need more education more training, we are giving them but I don't think it's still enough."
Leadership and communication (18)	"…the leadership's visibility and cooperation because especially the heads of the departments you will have a hard time with them and therefore their staff. because of their leaders did not motivate them."
Organizational culture and provider attitude (9)	"… I think the structure and culture of the hospital should change."
Enough time for preparation (2)	"I think the preparation of the JCI comes with having to change the culture of the people and this is the most difficult part if the people work in their own way that they are used to, and you start to change the whole practice and will take time so it's difficult to accommodate in such a short amount of time."

*Joint Commission International Accreditation

**The number of participant responses is indicated between parenthesis

The Participants' Recommendations to Improve the Impact of the JCIA Process on the Quality of Services

There was a total of nine recommendations mentioned by study participants that addressed many of the factors that hinder the JCIA process. (Table 5.6). To address the workload issue, three participants including two nurses and a pharmacist suggested that additional staff should be hired to meet the additional load resulting from meeting the JCI's standards. Another recommendation for reducing the workload was to decrease the amount of documentation and paperwork that needs to be completed by health providers. Several participants stated that there's still some duplication of information in forms, and one approach to address this is to use an efficient electronic system to replace paper documents and forms that were previously used.

Furthermore, six participants recommended more comprehensive training sessions on quality improvement and international accreditation. One quality department employee suggested adopting a similar hands-on training approach to that offered at Johns Hopkins Aramco Hospital. According to the participant, a practical training program is more suitable for employees with no prior experience, since it not only explains the use of different quality improvement tools but how to apply them to sample projects. Using these sample projects trainees will be able to plan, select the correct measures for analyses, and formulate and implement solutions while receiving continuous feedback from instructors.

Five participants had another recommendation that would facilitate this process: the involvement of stakeholders in the accreditation process and quality improvement efforts from its early stages. According to participants, the involvement of stakeholders not only ensures the collection of more useful data, but it can also reduce resistance to change. This approach reduces resistance since it would allow health providers to be involved in changing the policies and procedures and be familiar with them as opposed to asking them to comply with sudden changes in their workflow. In other words, there needs to be more emphasis on practical knowledge rather than theoretical knowledge which was the focus of previous training sessions.

Based on six participant responses, direct involvement from the leadership can increase the compliance of employees from all departments. For instance, one quality department employee stated that the leadership "should write a letter to the staff and put the name of the hospital head and they will follow. I'm joking but it is true because the only way to get providers to join the effort if it was from the head." Receiving a letter directly from the office of the president shows employees that the leadership is committed to improving quality and meeting the JCI's standards making it a priority for everyone at the hospital. Another approach to increase compliance is for the leadership to make some effort to change the organization's culture to one that accepts change and makes quality improvement a priority. A physician stated that "being static is one of the biggest of the organization's culture and finding ways to address is it crucial. The hospital should change the culture to make it from static to dynamic and accepting of constant change."

Two health providers expressed that the JCI surveyors may not be very familiar with certain areas of how a teaching hospital in Saudi Arabia operates and suggested requesting more experienced surveyors. They believe that surveyors should also have more detailed and realistic recommendations and use measures other than KPIs for evaluation. These recommendations were mentioned by different types of providers for instance, one pharmacist recommended "a surveyor to have experience in pharmacy. They have recommendations for us, and they are fine, but they are not as detailed and specific as CBAHI." Since CBAHI is a national accreditation organization, its surveyors are more familiar with Saudi hospitals and their workforce, therefore, providing more detailed and more realistic recommendations for improvement. This was also echoed by another participant, a physician, who suggested that "they should be more like CBAHI's survey professionals who are better at assessing how hospitals in the country work since they are more familiar with the practices and patient population which makes it easier to track our progress using not only KPIs but they also ask specific questions unlike the JCI which is more focused on using KPIs." She recommended that they become more familiar with each country's practices before evaluating a hospital and take into consideration cultural differences that may impact practice.

Lastly, two recommendations were made to ensure the compliance of employees in meeting the JCIA standards and contributing to quality improvement efforts. Despite several participants stating that mandating compliance and enforcing sanctions are not effective, one physician believed that it may be the right approach stating "I think it's like raising a child so the leadership should enforce it. Sometimes in the eyes of the child, they don't know what's good or bad for them. So, it's good to have a different eye, to help them know what is right and what is wrong." The physician's statement seemed to provide some justification for the use of a paternalistic intervention from the leadership to ensure compliance since employees do not realize the importance of being accredited. Nevertheless, over 14 participants believe that the use of incentives is a better approach. Different types of recommended incentives mentioned include monetary compensation such as a salary increase or a bonus, additional vacation days, awards and recognition.

Table 5.6. Participants' recommendations for improvement

Theme	Sample quote
Additional staff (3)	"to compensate the extra workload there should be enough staff."
Education and training (6)	"we had a hard time explaining patient safety per se, what is it? are you talking about the patient not falling down only?"
Improve monitoring of results (3)	"There needs to be a better way to monitor patients during their stay at the hospital especially if they were readmitted"
Decrease paperwork (3)	"I hope that by making an electronic system it will remove all these problems [duplication of paperwork] "
Use of incentives (14)	"an incentive like employees of the month if money was a problem"
Involvement of stakeholders (5)	"...involve them in the protocols so that compliance would be better"
Leadership involvement (6)	"They should write a letter to the staff and put the name of the (hospital head) and they will follow. I'm joking but it is true because the only way to get providers to join the effort if it was from the head."
More experienced surveyors (2)	"I recommend getting a surveyor to have experience in pharmacy. they have recommendations for us and they are fine, but they are not as detailed and specific as CBAHI"

Organizational culture and provider attitude (3)	"JCI they gave us this safety culture that we are supposed to be adopting not only because we want to comply to pass the JCI and all. This is the thing that should be targeted by the administration."
Mandating compliance (2)	"I think it's like raising a child so the leadership should enforce it. Sometimes in the eyes of the child, they don't know what's good or bad for them. So, it's good to have a different eye, to help them know what is right and what is wrong..."
Improvement of the work environment (3)	"…The other element you need to have the facility, the space. they cannot help you if they do not have the facility."

Overall Interpretation of Qualitative Results

All of the participants had an overall positive perception of the JCIA process. The positive perceptions were grouped into eight categories:

1. The improvement of the training and the education of health providers on quality improvement, patient safety, and patient rights
2. The reduced paperwork due to merging multiple forms into one form such as the transformation from having separate progress notes for each type of provider to using multidisciplinary notes
3. The improved quality and patient safety such as the reduction of medication errors
4. Improved organization of quality improvement efforts and a more streamlined monitoring of quality outcomes
5. A more engaged hospital leadership which communicates better with employees at all levels
6. Improved processes due to the standardization of policies and procedures in all departments
7. Creating an organizational culture that supports the involvement in quality improvement efforts and the promotion of a culture of patient safety
8. Improved awareness of the significance of quality improvement and its benefits to health providers and administrators

Even though all of the participants had a positive perception of the accreditation's impact, they also highlighted some of its drawbacks:

1. The increased workload associated with meeting the JCIA requirements and the short deadlines which lead to the resistance of many providers to participate in the process
2. The use of sanctions and mandating compliance, since they increase resistance from providers and create a negative attitude towards the JCIA process
3. The resistance from providers that happened as the result of introducing the JCIA for the first time at the hospital
4. The limited education and training especially on the benefits and importance of international accreditation
5. The unsustainable quality improvement in the long run
6. The lack of proper communication with some employees regarding the JCIA which was reported by medical record employees
7. Focus on improving process alone without taking enhancing the structure of the hospital into consideration
8. The misinterpretation of data which can lead to misconceptions regarding the impact of the intervention such as confusing the increase of OVRs as a result of an actual increased in sentinel events

The health provider's responses also provided some insights on the factors that facilitate or hinder the success of the JCIA process in improving the quality of health services at KFHU. A total of eight main factors were identified:

1. The increasing workload associated with meeting the JCIA standards was one of the main obstacles that limited its success

2. The limitations of the hospital's structure that cannot meet with the increased demands of the patients and the JCIA, such as increasing the number of nurses, physicians, and quality improvement employees
3. Resistance from providers, especially physicians that are discouraged from participating in the quality improvement efforts
4. The use of incentives was one of the most commonly mentioned factors that would increase participation in the JCIA process
5. Education or training in quality improvement
6. The involvement of the hospital's leadership in quality improving efforts
7. Having an organizational culture that encourages quality improvements and promotes patient safety
8. Enough time for preparation since some participants felt that the deadlines to meet the JCI standards were unrealistic

To address the obstacles that might prevent the success of the JCIA, the study participants made a total of 11 recommendations to overcome them or to make the process more efficient in the future:

1. Hiring additional staff to keep up with the increasing demands of the JCIA and the increased workload introduced by the process
2. Education and training of employees to acquire specific skills pertaining to improving different aspects of quality such as risk management
3. Improve monitoring of results to include additional KPIs
4. Reducing paperwork to address provider resistance

5. Use of incentives to encourage the participation of health providers
6. Involvement of stakeholders from the beginning in formulating solutions to ensure compliance
7. Direct involvement of leadership in requesting the cooperation of all departments
8. Requesting more experienced surveyors who are familiar with the process, especially in a teaching hospital in Saudi Arabia, and who could provide more detailed recommendations for improvement
9. Change in organizational culture and provider attitude that encourages quality improvement beyond meeting the JCI's standards
10. Mandating compliance, recommended by two providers, even though most participants believed that the use of incentives is more effective
11. Improvement of work environment, including providing better facilities for employees

In conclusion, international accreditation was viewed positively by study participants who believed it was beneficial to the hospital. However, the participants had mixed views on what they think improved, the sustainability of the improvements, and their magnitude. The most commonly mentioned benefit was the improvement of process, policies, and procedures. Furthermore, the participants' identified factors and recommendations that could influence the efficiency and effectiveness of the JCIA process. Figure 5.13 provides a graphical representation of the theory that explains the main factors pertaining to behavior, structure, and the JCIA process. One of the core behavioral issues that hindered the effectiveness of accreditation was the resistance from health providers. This resistance was caused by the increasing workload, limited training, lack of incentives and the organizational culture. In the beginning stages of preparing for the JCIA, the organizational culture did not consider quality improvement a priority and providers believed that their focus should be on the clinical aspect of their jobs.

As for factors relating to structures, leadership had the greatest impact, since it can influence an increase in training, the number of employees, and preparation time. Furthermore, the hospital's leadership can have more impact on its employees if there was to be an improvement in communication and in the work environment by

providing better facilities. More importantly, the hospital's administration plays a crucial role in motivating its employees toward the common goal of achieving the JCIA and improving the quality of services in the long run.

Lastly, when it comes to the JCIA there are factors relating to its surveyors as well as its standards. The JCIA surveyors must be familiar with and experienced in working with a teaching hospital in Saudi Arabia to ensure that their recommendations are feasible at KFHU. Moreover, the JCI standards seem to focus on improving process with little regard to improving structures such as physician to patient ratio. The standards might not be necessary or applicable to KFHU which was the case at the laboratory department that already had standards in place that meet and exceed what the JCIA requires. All these factors need to be addressed collectively to ensure a more efficient implementation of the JCIA and to ensure long term positive outcomes.

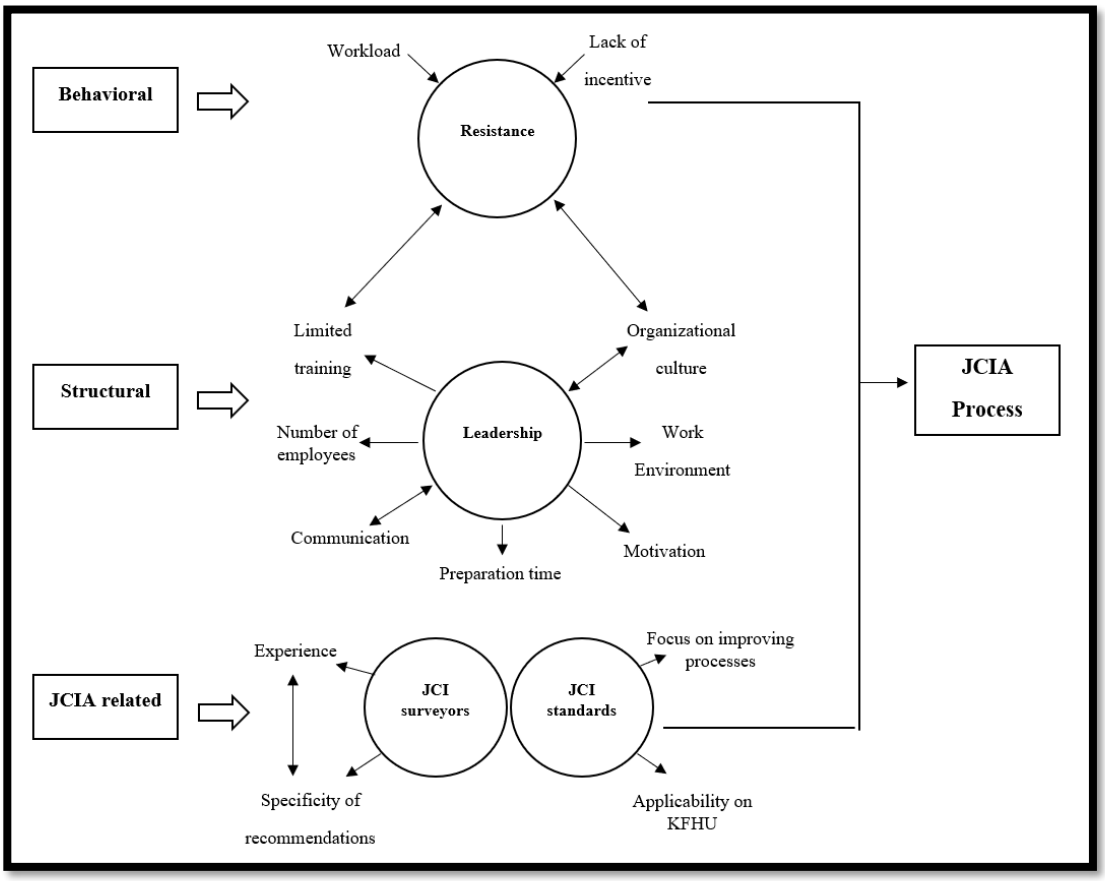

Figure 5.13: Factors influencing the accreditation process theory

KFHU stands for King Fahd Hospital of University

JCI stands for The Joint Commission International

Interpretation of Mixed Results

According to the quantitative results, the JCIA had a positive impact on most of the outcome measures of the study. This was supported by the qualitative data that showed that all the participants believe that the impact of international accreditation is mostly positive. Nevertheless, the participants had mixed perceptions of the magnitude and the sustainability of the improvements which coincide with the quantitative results. The quantitative results indicated that the extent and the longevity of the improvements caused by the JCIA varies among the 10 improved outcomes. The positive changes were either immediate, lagged or both.

All the improvements were sustained after the intervention except for the average length of stay which only improved immediately after the intervention. This contradicts some of the participants' statements that suggested that the JCIA formal survey caused temporary improvements as a result of a possible Hawthorne Effect. Nevertheless, a Hawthorne Effect may have been produced in KPIs that were based on observations at any time during the JCIA process. For instance, one physician stated that she did not perceive any drastic improvements in hand hygiene compliance from doctors after the accreditation contradictory to what the quantitative results suggest. Nevertheless, the physician's statement may not necessarily mean that hand hygiene did not improve but it calls into question how observation-based KPIs were collected. The doctor's comment suggests that there should be methods to ensure that proper hand hygiene is always followed by conducting continuous internal audits rather than occasional observations.

Another issue with the improved outcomes is that they may not have been a result of the JCIA process according to some participants. For example, the percentage of laboratory critical value reporting within 30 minutes already had high compliance of 99.37% prior to the JCIA process since they laboratory department already adhered to the College of American Pathologists (CAP) Laboratory Accreditation Program according to the lab specialists and quality department employees that were interviewed. Another example of an outcome that may have not improved due to receiving accreditation according to a participant is mortality rates. Mortality rates may have not improved as a result of pursuing the JCIA since its focus is more on improving the process which might not translate

to better patient outcomes, especially in a three-year period. This was supported by a quality department employee who stated that they did not have any performance improvement projects that targeted the reduction of patient mortality which indicates that the JCIA may not have a direct impact on reducing them at KFHU.

On the other hand, some participants believed that the JCIA process did not immediately show progress, especially before the formal survey because of multiple factors. The factors that caused a delay in the JCIA's impact included lack of education, provider resistance, limited resources, and other causes. This delay in improvement is also reflected in the quantitative results that showed sustained improvement after the formal survey as compared to the baseline level of the KPI in 2014. Most of the positive outcomes were sustained because health providers were more familiar with the JCIA process after the formal survey and were more involved in the quality improvement process.

The outcomes that did not show any improvements included: the rate of patients who left the ER without being seen, the percentage of OR cancelations, and the rate of patient falls. The qualitative analysis provided some context and reasons to the lack of improvements for these KPIS. One participant stated the increasing in the number of patients leaving the ER is since many patients use the emergency room to open a medical record and not to seek treatment which lead to the increase. Furthermore, a potential cause of the increased number of patients falls is the fact that they were underreported prior to the JCIA process and may have not actually increased. After the introduction of the JCIA, the quality department ensured that there was an increased awareness among nurses on the importance of reporting patient falls, which caused an increased in reporting. Furthermore, a nurse and quality department employee stated that another potential reason for the increase in patient falls is the high nursing staff turnover rate that led to creating an unstable workforce and an influx of new nurses with limited training: these may have contributed to patient falls as reported by a participant.

Discussion

The findings of this study show that the impact of accreditation was positive for the majority of outcome measures selected. A total of 10 out of 12 outcome measures showed improvements in this study including: the average length of stay, hand hygiene compliance, nosocomial infections, radiology reporting, pressure ulcers, correct patient identification, critical lab reporting, bed occupancy, OR cancelations and patient mortality. The outcomes that did not show any improvements were patient falls and the number of patients leaving the ER without being seen. The JCIA's impact was also perceived by all participants as being positive and that it led to the overall improvement of health care provided at KFHU. Despite the overwhelmingly positive perception of the JCIA, participants believed that it had some drawbacks such as the increased workload, resistance from health providers, unsustainable improvements, inexperienced JCIA surveyors, and focusing on improving processes alone. These results suggest that international accreditation was able to improve most outcomes and was perceived positively by hospital administrators and health providers alike.

Some of the study results were solely achieved due the utilization of the mixed methods framework. This framework allowed the researcher to better interpret the context of quantitative results and to ensure their accuracy. For instance, if the rate of patient falls was interpreted by using the quantitative results it might have led the researcher to falsely conclude that there was an increase. However, due to interpreting both the quantitative and qualitative data, it led to understanding the context and the conclusion that the increase in patient falls was attributed to the increase in reporting and not to an actual increase in falls. Furthermore, the interpretation of the mixed results brought attention to concerns about the validity of observation-based KPIs such as hand hygiene compliance which

might have improved due to the health providers' awareness of being observed and resulting in a potential Hawthorne Effect. Additionally, mixed results identified two outcomes that did not improve due to the JCIA impact: the percentage of laboratory critical value reporting within 30 minutes and mortality rates. According to lab specialists, laboratory reporting was already at a high compliance rate of 99.37% before the implementation of the JCIA since the laboratory department was already CAP accredited. As for mortality rates, the improvement may not have been due to pursuing the JCIA directly since, according to the quality department, there were no quality improvement efforts to reduce mortality rates during the JCIA preparation process.

Quantitative studies on the impact of international accreditation on the overall quality of service in health organizations are inconclusive. This variation in results is most likely due to the heterogeneity in study designs, outcome measures, and hospital settings. (Brubakk et al., 2015) Some suggested that the JCIA had little or no impact on certain quality and patient outcomes. For instance, an observational study conducted on 4400 hospitals in the US of which 2847 were JCIA accredited and were compared with hospitals with state-based accredited hospitals. The study's outcomes measures were risk-adjusted mortality, readmission rate within 30 days and patient experience scores. The study's results suggested that hospitals that were accredited by external organizations such as the JCIA were not associated with lower mortality rates and a limited decrease in readmission rates. Therefore, the study concluded that choosing a hospital that's JCI accredited may not have any benefits over other hospitals. (Lam, et al., 2018)

On the other hand, there are studies that concluded that being JCIA accredited had a predominately positive impact. An example of a study with predominately positive outcomes is an interrupted time series study conducted

in a 150-bed multi-specialty hospital in the UAE during a 48-month period using 27 outcomes measures. (Devkaran & O'Farrell, 2015) Five out of 12 of this study's outcome measures correspond with the Devkaran & O'Farrell which was conducted. The outcome measures that this study and the UAE study share included: mortality rates, rate of patient falls, percentage of hand hygiene compliance, hospital-acquired infections, and OR cancelations. Based on this study's results there was a statistically significant decrease in mortality rates pre-accreditation and a statistically significant decrease in the post accreditation slope. Furthermore, the results of this research indicate that there was a 3.34 decrease immediately after the intervention ($P \geq 0.004$) and a 0.51 monthly sustained decrease in mortality rates; whereas, the Devkaran & O'Farrell study had no significant coefficients for mortality rates which lead the researchers to conclude that this was since the JCIA is more process and structure focused and would not impact outcomes measures. Furthermore, looking at the coefficients for mortality rates for the UAE study, it showed a minor decrease of 0.01 in level after the accreditation formal survey and a monthly sustained decrease of -0.02 afterwards which is a much smaller decrease. Nevertheless, this decrease in mortality rates may not be associated with receiving accreditation which is supported by an observational study conducted in the US. The US study found that there was no difference in mortality rates between JCIA accredited hospitals and non-accredited hospitals. The researchers concluded that the lack of improvement is possibly due the fact the private accrediting organization such as the JCI focus on improving clinical processes rather than improving patient outcomes. (Lam, et al., 2018)

According to this study's results, the rate of patient falls slightly decreased by 0.01 directly after the intention and had a 0.01 decrease in the post accreditation slope ($P \geq 0.004$). As for the Devkaran & O'Farrell study, its results show that the rate of patient falls has increased by 0.21($P \geq 0.05$) and had a statistically significant sustained decrease

by −0.67 per month contrary to this research's findings where the improvement was minor and temporary. This comparison suggested that the UAE hospital might have had a better action plan to continuously reduce the risk of patient falls which yielded long term improvements.

On the other hand, hand hygiene compliance at KFHU decreased by 3.09% after the intervention ($P \geq 0.004$), however, there was an improvement in compliance in the post accreditation slope by 0.18% per month. This finding is inconsistent with the Devkaran & O'Farrell study that observed an increase in the level immediately after the accreditation but a decrease in hand hygiene compliance in the post accreditation slop. Poor hand hygiene compliance is an important indicator since it is a major contributor to hospital-acquired infections. (CDC, 2019) The rate if hospital acquitted infections in both studies somewhat coincide. The results of this study indicate that nosocomial infections increased immediately after the accreditation, but it had a sustained decrease after the intervention. Similarly, there was an increase in level for hospital-acquired infections but there was also a smaller increase in the post accreditation slope. However, the researchers of the UAE study attributed this increase in infections to the implementation of an infection surveillance program after the survey which leads to an increase in the reporting of nosocomial infections.

Furthermore, publish research on the topic did had very limited information on the accreditation context and the factors that lead to certain outcomes. For that reason, this dissertation research used a mixed methods approach to identify these factors and get more detailed information on how the JCIA works to improve quality outcomes. The participants reported that the main factors that affect the effectiveness of accreditation were resistance from providers, increased workload, lack of improving structure, limited training, insufficient commitment from the leadership and limited time for preparation. Most studies reported similar factors such as resistance to change, time limitations, organizational cultural issues, and limited training. Furthermore, other studies have also highlighted the role of rewards and recognition in reducing resistance which was also suggested the participants of this study. (Ng, Leung, Johnston, & Cowling, 2013)

Some studies emphasized the importance of leadership involvement in overcoming barriers that prevent the successful implementation of the JCIA while other studies identified provider resistance as one of the most important factors. (Abolfotouh et al., 2014) One qualitative study utilized a qualitative method to identify factors that influence the implementation of JCI standards in a variety of hospitals in the UAE. The UAE's research findings coincide with this dissertation research in identifying resistance to change, time limitations, organizational cultural issues, and limited training. However, the study also identified the cost of accreditation as a major obstacle to hospital administrators which was not expressed by the participants of this dissertation research. (Al Attal, 2009) Nevertheless, very few of these studies provided more context or identified factors that cause changes or lack thereof to specific outcomes on a particular hospital. The results of this research indicate the importance of investigating the context and identifying the potential causes of the changes in the quantitative results and to account for the complex effects of the process. A qualitative approach is also crucial to investigate the role of each hospital's unique organizational culture and how it influences the JCIA process.

Chapter 6: Conclusions

Conclusions and Recommendations

There's a global interest in improving the quality of health care has caused many decision makers to adopt standardized processes to evaluate health organizations. This lead many hospitals in different countries to pursue the JCIA, despite the sparse and inconsistence evidence on its effectiveness. Among these countries was Saudi Arabia, which has the third-highest number of JCIA-accredited health organizations. This study is possibly the first to utilize a mixed methods approach with a quasi-experimental design to assess the impact of accreditation. Using this framework helped enabled an understanding of how pursuing international accreditation affects the quality of services delivered, while at the same time providing context and identifying underlying factors that influence the process.

The analysis showed that, the JCIA had positive impacts on the majority of study outcomes; however, some positive impacts can be immediate, lagged, or both. The average length of stay appeared to have improved immediately after the intervention but increased in the post accreditation slope. Hand hygiene compliance, nosocomial infections, radiology reporting, pressure ulcers, correct patient identification before medication administration, critical lab reporting within 30 minutes and bed occupancy did not improve instantly after the intervention but had an improvement in the post accreditation slope. As for operating room cancelations on the day of the procedure and mortality rates they showed both an immediate and a lagged improvement post accreditation. Nevertheless, according to participant feedback, the percentage of hand hygiene compliance may have not actually increased since it was based on observation which may have produced a Hawthorne effect. To overcome observation bias it is recommended that the hospital adopts continuous internal audits instead of occasional observations.

Furthermore, the decrease in mortality rates may not be a direct result of the JCIA process since the hospital did not have any performance improvement projects that directly targeted mortality rates. The decrease of mortality rates at KFHU might have been due to the improvements made to processes, however, this remains to be investigated.

As for the outcomes that did not demonstrate any improvements, they included the rate of patients who left the ER without being seen and the rate of patient falls which both immediate and lagged increase. According to participants, the potential causes of the increase in patient falls may be simply a result of an awareness campaign which targeted nurses on the importance of quality improvement which lead them to report such incidences more often. Other potential causes of the increase in patient falls is the high nurse turn-over rate and the high rate of untrained new nurses. This supports the statements of some participants that emphasized the importance of adjusting structure as well as process to ensure better outcomes.

Other factors that influence the success of the JCIA process can be grouped into three categories: behavior, structure, and JCI related. The behavior-related factors are mainly related to provider resistance which is caused by the increased workload, lack of incentives, and limited training. As for structural factors, leadership was the core issue since it directly impacted multiple other factors such as motivation, and work environment. Lastly, JCI related factors which included factors pertaining to JCI surveyors and JCI standards. JCI surveyors, according to participants, did not have enough experience and were not familiar with the organizational culture of a teaching hospital in Saudi Arabia which caused a lack of specificity in their recommendations. The biggest issue with JCI standards was their focus on improving process without much consideration to the limited structures at KFHU.

All of these factors showcase the complexity of the accreditation's impact from providers' perspective and need to be addressed by the hospital's leadership to ensure a more efficient implementation of the JCIA in upcoming accreditation cycles. One recommendation to the KFHU administration is to include more structure-related KPIs to better assess their impact on both process and outcomes and to formulate more feasible solutions. For instance, an

important KPI to introduce would be the nurse turnover rate since the qualitative analysis suggests that it might have a direct impact on the rate of patient falls and possibly other patient safety outcomes. Moreover, to ensure more cooperation from health providers the leadership should address the factors that cause resistance to participate in the JCIA process. Lastly, introducing additional relevant KPIs can assist the hospital's administration in formulating more informed policed and procedures.

One of the main reasons for resistance is the lack of incentives for involvement in the accreditation process. Many participants felt that being pressured to participate and mandating compliance without any sort of incentive created a lot of resistance. To address this issue, incentives such as recognition, awards, monetary compensation should be introduced to encourage administrative employees and health professionals at all levels to participate at higher levels. An additional recommendation is for the hospital's leadership is to make improvements in the work environment in all departments. Several participants noted that there were limited meeting areas for them to work with other departments on quality improvement projects on a regular basis. Creating workspaces that encourage better teamwork can increase the participation of different stakeholder and ultimately creating more effective interventions.

Furthermore, several participants expressed their concern the some of the positive effects of the JCIA are unsustainable. This was also addressed in the Devkaran & O'Farrell study conducted in the UAE which recommended shifting from using a "snap-shot review to a continual assessment". (2015) In addition to suggesting the use of frequent assessment, to mitigate the effects of a Hawthorne Effect is to use announced or unscheduled internal audits to ensure the compliance of health professionals to policies and procedures such as proper hand hygiene compliance. Lastly, this study identified issues regarding the JCIA program itself including the JCI surveyors and the JCI standards. According to the participant's responses, they though the surveyors were not specific with their recommendations to improve certain outcomes which made their proposed solutions unfeasible at KFHU. For that reason, it is recommended that the JCI takes into consideration encouraging their surveyors to

familiarize themselves with each hospital's unique organizational culture. The surveyors should also take into consideration each hospital's size, structures and rescuers to ensure the specificity and the feasibility of their recommendations for improvements.

Study Limitations and Implications for Further Research

This study was limited to a single teaching hospital in Khobar, Saudi Arabia. Therefore, the results may not be generalized to other hospitals in different countries or with different settings, sizes, and services. Another limitation is that the dissertation research had a total of 12 outcome measures, which were limited to process and outcome measures. Future research should include structural measures, such as physician-to-patient ratio, to ensure the assessment of the impact of the JCIA process on all the domains of quality. Adding structure-related KPIs can also give some insight as to why certain outcomes did not improve. For instance, the lack of improvement in a certain outcome may not be due to an issue in compliance to a process but due to limited personnel or resources. It also important to note that despite excluding many KPIs from this study, it may not have skewed the assessment of the impact of the JCIA since the hospital did not make any interventions to outcomes they did not measure. However, some important KPIs were excluded due not being measured every month or were not collected throughout the period of study such as sentinel events which was collected three months after accreditation. The limited number of KPIs can be avoided in future studies since many hospitals in the Kingdom, including KFHU, are now more acquainted with the JCIA process and the importance of continues monitoring and evaluation. Additionally, a single time series may not have accounted for the possibility of seasonal effects, especially if the pre- and post-intervention months are uneven which could create a bias in the results. This bias is caused by the unequal distribution of summer to winter months. To account for seasonality, future research should adopt a model that is stratified by month using dummy variables for each month. Another solution would be to use a control group which is referred to as a controlled interrupted time series design.

One of the limitations of the qualitative analysis was the limited involvement of some of the participants in the accreditation process. Most of the participants from the medical records and the radiology department noted that they were not involved from the beginning in the accreditation efforts; therefore, their responses did not provide a comprehensive view of its impact in relation to their work. Additionally, no interviews or surveys were used to understand the patients' perspectives towards this process. Future studies should aim to investigate the attitudes and perceptions of patients towards JCIA-accredited hospitals versus non-accredited hospitals since this information can assist decision makers in improving the patient experience. Moreover, the qualitative analysis in this study indicated the need to investigate the associations between different outcomes, such as the potential link between the rates of hospital-acquired infections and hand hygiene compliance, in order to provide more insight on how the JCIA process itself led to better outcomes.

Lastly, the study period only included one accreditation cycle which might limit some of the factors that were identified in this study to obstacles hospitals going through the JCIA process for the first time. For instance, provider resistance to participate in quality improvement efforts may decrease in future accreditation cycles due to the shift in the organizational culture to a culture that promotes patient safety. Additionally, a longer study period would be needed to investigate the impact of newly introduced KPIs at KFHU such as the rate of medication errors and the number of near misses which are the incidents that were unplanned but came close to causing harm or injury to patients. For that reason, further research is necessary to investigate factors that influence the effectiveness of accreditation and its impact on hospitals going through more accreditation cycle several times.

Appendix A: Figures

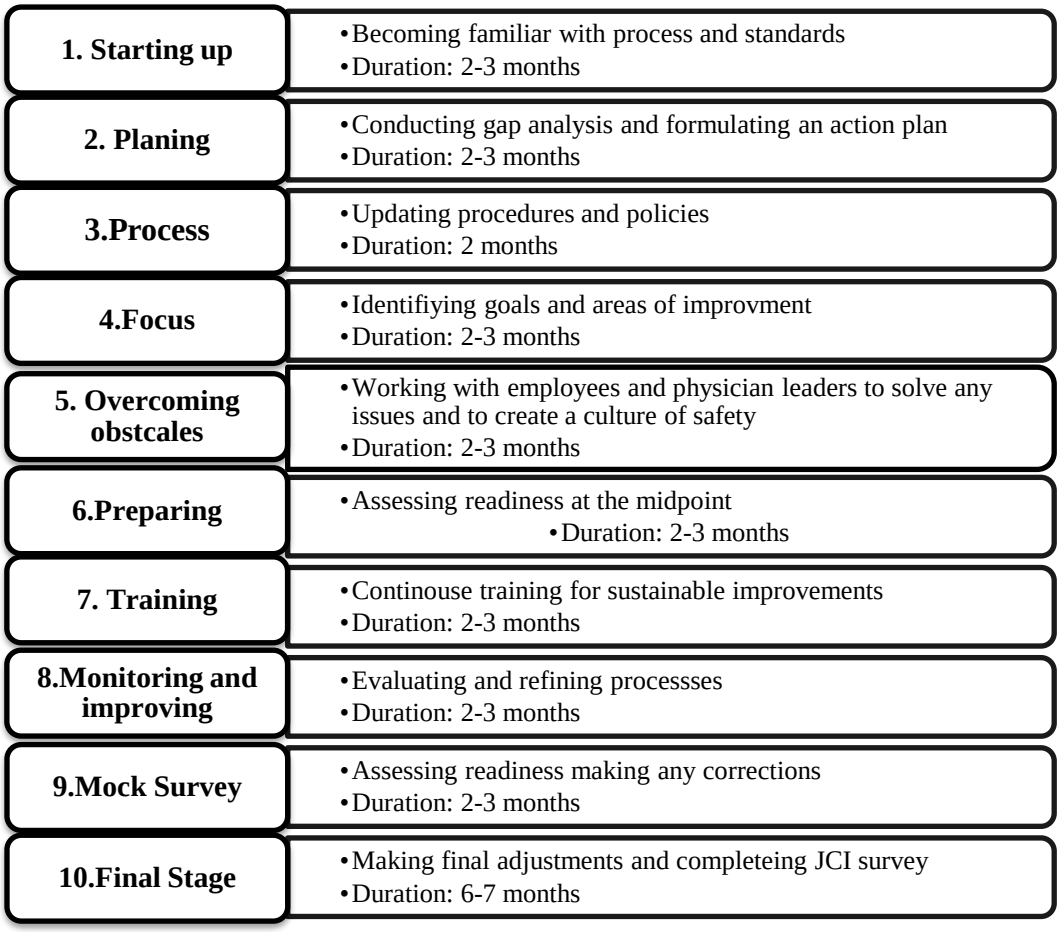

Figure 1: Pathway to accreditation, retrieved from https://www.jointcommissioninternational.org/pathway/

Appendix B: Tables

KPI*	Description
1. Hand hygiene compliance	The percentage of health providers who comply with the proper hand hygiene procedures
2. Rate of hospital acquired infections	The rate of hospital acquired infections per 1000 Patients' Days
3. Patient identification	Percentage of the correct patient identification during medication preparation by nurses
4. Radiology reporting	Percentage of radiology report turnaround time outlier
5. Lab reporting	Percentage of laboratory critical values reporting within 30 minutes
6. Pressure ulcer	Pressure ulcer incidence rate per 1000 patients' days
7. OR cancelations	Percentage of OR cancellations on the day of the procedure
8. Patients leaving ER without being seen	The percentage of patients leaving the ER without being seen
9. Mortality rate	The mortality rate per 1000 patients
10. Patient falls	Falls rate per 1000 Patients' Days
11. Length of stay	Average Length of Stay
12. Bed Occupancy	The percentage of occupied beds

Table 1: Description of each KPI

***KPI** refers to Key performance indicators

Codebook

Table 2: Open codes

Codes	Description	Sample Quotes
Perceptions	The participants' perceptions towards the changes resulting from accreditation process (includes both positive and negative perceptions).	"I think the JCI just put everything together, so it made it more organized and easier to be monitored."
Factors	The factors that improve or hinder the effectiveness of the accreditation process in improving the quality of services.	"From my point of view, that is the reason why we are having the problem even in the transition from paper-based to electronic we find that the participation of the physicians is less compared to the other departments."
Recommendations	The participants' recommendations to the hospital's leadership or the Joint Commission International to improve this process and overcome the factors that limit its effectives in improving quality.	"…The other element you need to have the facility, the space. they cannot help you if they do not have the facility."

Table 2: Axial codes

Codes	Description	Sample Quotes
Positive perceptions	The participants' perceptions about the benefits of international accreditation	"That is what we call the standardization of this and this is the benefit that we got from the JCI."
Negative perceptions	The participants' perceptions about the drawback of the international accreditation process	"The amount of workload increased a lot"

Codes	Description	Sample Quotes
Workload	The additional work and time produced by participating in the accreditation process.	"to compensate the extra workload there should be enough staff. "
Improving the hospital's structure	The improvement of the facilities, training, and staffing.	"…and one of the structures that we have to focus on is the patient-staff ratio, these are a part of the nursing indicators."
Resistance from providers	The resistance of health providers to participate in the accreditation process.	"From my point of view, that is the reason why we are having the problem even in the transition from paper-based to electronic we find that the participation of the physicians is less compared to the other departments."
Use of incentives	The use of incentives to employees for their participation in pursing international accreditation.	"an incentive like employees of the month if money was a problem"
Education or training	The training and education provided to hospital employees on the benefit of quality improvement and how to participate in quality improvement efforts.	"I think they need more education more training, we are giving them but I don't think it's still enough."

Leadership and communication	The role of the hospital's leadership in promoting the goals of achieving international accreditation and the good communication of the steps that need to be made to accomplish that goal.	"…the leadership's visibility and cooperation because especially the heads of the departments you will have a hard time with them and therefore their staff. because of their leaders did not motivate them."
Organizational culture and provider attitude	Having a culture that promotes the participation in quality improvement.	"… I think the structure and culture of the hospital should change."
Time restrictions	Setting realistic deadlines to meet the requirements of international accreditation.	"I think the preparation of the JCI comes with having to change the culture of the people and this is the most difficult part if the people work in their own way that they are used to, and you start to change the whole practice and will take time so it's difficult to accommodate in such a short amount of time."

Recommendations

Codes	Description	Sample Quotes
Additional staff	Hiring additional employees to compensate the additional workload produced by pursing accreditation.	“to compensate the extra workload there should be enough staff.”
Education and training	Additional and relevant workshops and training in areas relevant to quality improvement and patient safety.	“we had a hard time explaining patient safety per se, what is it? are you talking about the patient not falling down only?”
Improve monitoring of results	The improvement of monitoring quality outcomes by introducing additional Key Performance Indicators and to improve previously used measures to ensure the accuracy of the results.	“There needs to be a better way to monitor patients during their stay at the hospital especially if they were readmitted”
Decrease paperwork	Decreasing the amount of paperwork that needs to be completed by health providers by decreasing duplication.	“I hope that by making an electronic system it will remove all these problems [duplication of paperwork] “
Use of incentives	Using incentives to motivate staff to be more involved in quality improvement efforts.	“an incentive like employees of the month if money was a problem”
Involvement of stakeholders	Involving stakeholders at all levels in the accreditation process from the early preparation stages.	“...involve them in the protocols so that compliance would be better”
Leadership involvement	The leaderships involvement in ensure the compliance with the international accreditation standards by all employees and being involved in the quality improvement efforts.	“They should write a letter to the staff and put the name of the (hospital head) and they will follow. I’m joking but it is true because the only way to get providers to join the effort if it was from the head.”

More experienced surveyors	Having surveyors who are more familiar with the culture of the hospital	“I recommend getting a surveyor to have experience in pharmacy. they have recommendations for us and they are fine, but they are not as detailed and specific as CBAHI”
Organizational culture and provider attitude	Fostering an organizational culture that encourages quality improvement.	“JCI they gave us this safety culture that we are supposed to be adopting not only because we want to comply to pass the JCI and all. This is the thing that should be targeted by the administration.”
Mandating compliance	Using measures to ensure the compliance of health providers to participate in the accreditation process.	“I think it's like raising a child so the leadership should enforce it. Sometimes in the eyes of the child, they don't know what's good or bad for them. So, it's good to have a different eye, to help them know what is right and what is wrong...”
Improvement of the work environment	Improving the work environment by providing the necessary facilities and incentives.	“…The other element you need to have the facility, the space. they cannot help you if they do not have the facility.”

Appendix C: Forms

Moderator's guide

Moderator introduction: (5 minutes)

My name is Deema Alshawan, a Health Services and Administration doctoral candidate at The University of Maryland. The purpose of the research is to understand your perception towards the impact of the accreditation process on the quality of services at the hospital and to provide recommendation for improvement to both the Joint Commission International and the Hospital's leadership to facilitate this process in the future.

Focus group/interview questions:

1. How did the JCIA impact the quality of services at the hospital?
   - If you think the impact is positive, explain why?
   - If you think the impact is negative, explain why?
2. What are the factors that influenced the JCIA process and its outcomes?
   - Why do you think these factors impact the JCIA process?
3. What are the barriers that prevent health providers from participating in this process?
   - If you were hesitant to participate, explain why?
   - If you felt encouraged to be involved in the process, explain why?
4. How can the JCIA process be improved?
5. How is international accreditation different than national accreditation?

The Impact of International Accreditation on the Quality of Health Services in King Fahd University Hospital, Saudi Arabia

---

Participant Consent Form

You are invited to participate in a research study on the impact of the Joint Commission International Accreditation's (JCIA) impact on the quality of services at KFHU. Please read this form carefully and ask any questions you may have before agreeing to participate in the research. This study is being conducted by Deema Alshawan, a Health Services and Administration doctoral candidate at The University of Maryland. The purpose of the research is to understand your perception towards the impact of the accreditation process on the quality of services at the hospital and to provide recommendation for improvement to both the Joint Commission International and the Hospital's leadership to facilitate this process in the future.

If you agree to participate in this research, I will conduct an interview or a focus group with you. You will be one of approximately 20 health providers and administrators being interviewed for this research. The interview will include questions about your background, your experiences implementing the JCIA, along with any support you have received from administrators and the quality department at the hospital. The interview will last between 30 to 45 minutes. The interview will be audio recorded and notes might be taken during the interview. If you do not want the interview to be audio taped, you can still participate in the study and only notes will be taken.

Risks and benefits: There are no anticipated risks to you if you participate in this research, beyond minimal risks, which are encountered in everyday life. There are no direct benefits to you and you will not be compensated for your participation. Your answers will be confidential. The records of this study will be kept private and confidential to the extent permitted by law. You will not be identified by name in any reports using information obtained from this interview. No one other the primary investigator of the research- will have access to original data, interview transcripts or audio files. Your responses to the interview questions will be kept confidential. Each interview will be saved using pseudonyms to ensure that personal identifiers are not revealed during the analysis and write up of findings. Additionally, all files will be password protected to ensure the confidentiality of your responses. All original files of collected data will be deleted once the research is completed (anticipated one year after data collection). This precaution will secure the confidentiality of your responses. Any report of this research that is made available to the public will not include your name or any other individual information by which you could be identified. Your confidentiality as a participant in this study will remain secure.

Name: _____

Signature: _____

Date: _____

References

Abolfotouh, M., AlKelya, M., AbuKhalid, A., Salam, S., & Alamry, A. (2014). JCI Accreditation and Quality of Care in a Tertiary Care Hospital. ResearchGate, 47(1), 1447. Retrieved December 4, 2016, from https://www.researchgate.net/publication/261358412_Nursing_Perception_Towards_Impact_of_JCI_Accreditation_and_Quality_of_Care_in_a_Tertiary_Care_Hospital_Central_Saudi_Arabia.

Al Attal, Z. (2009). Factors affecting the implementation of joint commission international standards in United Arab Emirates hospitals (master's thesis, 2009). University of Salford.

Al Attal, Z. (2009). Factors affecting the implementation of joint commission international standards in United Arab Emirates hospitals.

Allan, G. (2003). A critique of using grounded theory as a research method. Electronic Journal of Business Research Methods, 1-2. Retrieved from www.ejbrm.com/issue/download.html?idArticle=126.

Al-Zamany, Y., Hoddell, S. E., & Savage, B. M. (2002). Understanding the difficulties of implementing quality management in Yemen. The TQM Magazine, 14(4), 240-247. doi:10.1108/09544780210429852

Armstrong, R. A. (2014). When to use the Bonferroni correction. Ophthalmic and Physiological Optics, 34(5), 502-508. doi:10.1111/opo.12131

Assurance, 17(3), 113-124. doi:10.1108/09526860410532757

Awa, B. A., Jacquery, A., Almazrooa, A., Habib, H., Al-Noury, K., Deek, B. E., . . .

Bernal, J. L., Soumerai, S., & Gasparrini, A. (2018). A methodological framework for model selection in interrupted time series studies. *Journal of Clinical Epidemiology*, *103*, 82–91. doi: 10.1016/j.jclinepi.2018.05.026

Bogdan, R., & Biklen, S. K. (2007). Qualitative research for education: An introduction to theory and methods. Boston, MA: Pearson Allyn & Bacon.

Bolognese, A. (2002). Employee resistance to organizational change. www.newfoundations.com/OrgTheory/Bolognese721.html

Brubakk, K., Vist, G. E., Bukholm, G., Barach, P., & Tjomsland, O. (2015). A systematic review of hospital accreditation: the challenges of measuring complex intervention effects. BMC Health Services Research, 15(1). doi:10.1186/s12913-015-0933-x

CDC, Hand Hygiene in Healthcare Settings (2019) Retrieved from https://www.cdc.gov/handhygiene/index.html

Chen, J., Rathore, S. S., Radford, M. J., & Krumholz, H. M. (2003). JCAHO Accreditation And Quality Of Care For Acute Myocardial Infarction. Health Affairs, 22(2), 243-254. doi:10.1377/hlthaff.22.2.243

CMS (2018, August 06). Overview. Retrieved from https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/QualityMeasures/index.html

Creswell, J. W., & L., P. C. (2011). Designing and conducting mixed methods research. Thousand Oaks, CA: SAGE.

Deming, W. E. (2000). Out of the crisis. Cambridge: MIT Press

Devkaran, S., & O'Farrell, P. N. (2015). The impact of hospital accreditation on quality measures: An interrupted time series analysis. BMC Health Services Research, 15(1). doi:10.1186/s12913-015-0784-5f

Devreux, I. (2011). Comparison of Patient Safety and Quality of Care Indicators Between Pre and Post Accreditation Periods in King Abdulaziz University Hospital. Research Journal of Medical Sciences, 5(1), 61-66. doi:10.3923/rjmsci.2011.61.66

El-Jardali, F., Jamal, D., Dimassi, H., Ammar, W., & Tchaghchaghian, V. (2007). The impact of hospital accreditation on quality of care: perception of Lebanese nurses. International Journal for Quality in Health Care, 20(5), 363-371. doi:10.1093/intqhc/mzn023

George Allan (2003). Grounded Theory Method (GTM). A Critique of Using Grounded Theory as a Research Method. doi:10.4135/9781526402196.n2

Gibberd, R. (2006). A prospective, multi-method, multi-disciplinary, multi-level, collaborative, social-organisational design for researching health sector accreditation [LP0560737]. BMC Health Services Research, 6(1). doi:10.1186/1472-6963-6-113

Greenfield, D., & Braithwaite, J. (2009). Developing the evidence base for accreditation of healthcare organisations: A call for transparency and innovation. Quality and Safety in Health Care, 18(3), 162-163. doi:10.1136/qshc.2009.032359

Halasa, Y., Zeng, W., Chappy, E., & Shepard, D. (2015). Value and impact of international hospital accreditation: A case study from Jordan. Eastern Mediterranean Health Journal, 21(2), 90-99. doi:10.26719/2015.21.2.90

Iles, Valerie. Really Managing Health Care. Open University Press, 2006.

JCI Accreditation Standards for Hospitals, 6th Edition. (2018). Retrieved from https://www.jointcommissioninternational.org/jci-accreditation-standards-for-hospitals-6th-edition/

JCI. (2016). JCI VIEW BOOK. Retrieved from https://www.jointcommissioninternational.org/assets/3/7/JCI-2016-Viewbook-4-26-final1.pdf

JCI-Accredited Organizations. (2017) Retrieved October 11, 2017, from https://www.jointcommissioninternational.org/about-jci/jci-accredited-organizations/

Jones, M., & Alony, I. (2011). Guiding the Use of Grounded Theory in Doctoral Studies – An Example from the Australian Film Industry. International Journal of Doctoral Studies, 6, 095-114. doi:10.28945/142

Jossey-Bass.

KFHU about us page (2015). Retrieved January 25, 2018, from https://www.iau.edu.sa/en/university-hospitals/king-fahd-hospital-of-the-university/about/more

Khan, S., & Alam, M. S. (2014). Kingdom of Saudi Arabia: A potential destination for medical tourism. Journal of Taibah University Medical Sciences, 9(4), 257-262. doi:10.1016/j.jtumed.2014.01.007

Lam, M. B., Figueroa, J. F., Feyman, Y., Reimold, K. E., Orav, E. J., & Jha, A. K. (2018). Association between patient outcomes and accreditation in US hospitals: observational study. Bmj. doi: 10.1136/bmj.k4011

Lam, M. B., Figueroa, J. F., Feyman, Y., Reimold, K. E., Orav, E. J., & Jha, A. K. (2018). Association between patient outcomes and accreditation in US hospitals: observational study. Bmj. doi: 10.1136/bmj.k4011

Lazar, J., Feng, J. H., & Hochheiser, H. (2017). Research methods in human computer interaction. Cambridge, MA: Morgan Kaufmann , an imprint of Elsevier.

Luce, Bindman, & Lee. (1994). A brief history of health care quality assessment and improvement in the United States. Western Journal of Medicine, 160(3), 263-268. Retrieved June 7, 2017, from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1022402/

Mccarney, Rob, et al. “The Hawthorne Effect: a Randomised, Controlled Trial.” BMC Medical Research Methodology, vol. 7, no. 1, 2007, doi:10.1186/1471-2288-7-30.f

MOH(2012, June). Dr. Tayan: WHO Experts Are Impressed by the High Level of the Saudi Health Services. Retrieved June 9, 2019, from http://www.moh.gov.sa/en/Ministry/MediaCenter/News/Pages/news-2012-06-09-001.aspx

MOH. (2012, June 9). Minister of Health Honors a Number of JCI-Accredited MOH Hospitals. Retrieved from https://www.moh.gov.sa/en/Ministry/MediaCenter/News/Pages/news-2012-06-09-001.aspx

Pathway to JCI Accreditation for Hospitals.(2018). Retrieved from https://www.jointcommissioninternational.org/pathway

Penelope Dash, MD; and David Meredith. (2010). When and how provider competition can improve health care delivery. Retrieved January 14, 2018, from https://www.mckinsey.com/industries/healthcare-systems-and-services/our-insights/when-and-how-provider-competition-can-improve-health-care-delivery

Pomey, M., Contandriopoulos, A., François, P., & Bertrand, D. (2004). Accreditation: a tool for organizational change in hospitals? International Journal of Health Care Quality

Qureshi, A., Ullah, S., & Ullah, R. (2012). (PDF) The trend of hospital accreditation in Saudi Arabia. Retrieved from https://www.researchgate.net/publication/324280185_The_trend_of_hospital_accreditation_in_Saudi_Arabia

Rawlins, R. (2001). Hospital accreditation is important. British Medical Journal, 322(7287), 671-677. Retrieved November 5, 2017, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1119860/.

Ross, T. K. (2014). Health care quality management: tools and applications. San Francisco, CA:

Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). Experimental and quasi-experimental designs for generalized causal inference. Belmont, CA: Wadsworth Cengage Learning.

Siemens. (2016)Standardizing Quality of Care. Retrieved January 14, 2018, from https://www.healthcare.siemens.com/magazine/mso-standardizing-quality-care.html

Wagner, A. K., Soumerai, S. B., Zhang, F., & Ross-Degnan, D. (2002). Segmented regression analysis of interrupted time series studies in medication use research. Journal of Clinical Pharmacy and Therapeutics,27(4), 299-309. doi:10.1046/j.1365-2710.2002.00430.x