

**ANALYSIS OF HOSPITAL PERFORMANCE BASED ON THE
QUALITY INDICATOR TOOL FOR HOSPITAL ACQUIRED
INFECTION**

Dissertation submitted to



The IIHMR University, Jaipur

for the partial fulfillment for the award of

the degree of Master of Business Administration (MBA)

in

Hospital and Health Management

by

Vrushali Anvikar Pothare

Under the supervision and Guidance of

Prof. Veena Nair

2019-2021

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DECLARATION

I hereby declare that this dissertation titled “**ANALYSIS OF HOSPITAL PERFORMANCE BASED ON THE QUALITY INDICATOR TOOL FOR HOSPITAL ACQUIRED INFECTION**” is the bonafide record of my original research work. I declare that it has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.

Vrushali A. Pothare

Date-

CERTIFICATE

This is to certify that Vrushali Anvikar Pothare at **Asian Heart Institute and Research Centre Private Limited, Mumbai** as a Management Trainee in Quality Department has successfully completed her internship on “ANALYSIS OF HOSPITAL PERFORMANCE BASED ON THE QUALITY INDICATOR TOOL FOR HOSPITAL ACQUIRED INFECTION” during March 22, 2021 to June 19, 2021.

Place: **MUMBAI**
Date: **3/7/2021**



Mukesh Sabharwal
CEO
Asian Heart Institute, Mumbai

ABSTRACT

Title- Analysis of Hospital Performance based on the Quality Indicator tool for hospital acquired infection.

Author- Vrushali Anvikar Pothare

Study objectives- To study the quality indicator tools used to assess and evaluate the hospital performance for Nosocomial Infection in Asian Heart Hospital, Mumbai as directed by JCI and NABH guidelines to understand the rationale and challenges for various key performance indicators by trend analysis for one year i.e., January 2019 to December 2019. *(This study is based on the data collected in year 2019; current year data is unavailable due to Covid-19.)*

Methodology- A retrospective, analytical study is conducted on basis of secondary data from various inpatients departments such as Wards and ICU's. The data is taken from departmental records and registers, incidence report sheets, HMIS, bundle forms considering NABH and JCI guidelines. A quantitative data is collected to study the trend analysis and challenges coming from various indicators. Tools used to find out the non-compliances in department with respect to hospital acquired infection are taken from the standard NABH guidelines.

Results- The study reveals that there are indicators related to Nosocomial infection such as hand washing compliances, surgical site infection, ventilator associated pneumonia, needle stick injuries which requires high attention to improve the quality of care in hospital setting.

Conclusion- Internal evaluation by conducting departmental rounds, continue training to the staff or In-service education keeping track of non-compliances coming from each department and their quality indicator are vital elements to minimize the hospital acquired infection and providing better quality care to the patients.

Keywords- Quality indicators, Hospital acquired infections (Nosocomial infection), Healthcare quality.

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ABBREVIATIONS

CQI	Continuous quality improvement
TQM	Total quality management
HAI	Hospital Acquired Infection
HMIS	Healthcare management information system
PCI	Prevention and control of infection
HIC	Hospital infection control
CAUTI.	Catheter associated Urinary tract infection
VAP	Ventilator associated pneumonia
CLABSI	Central line associated bloodstream infection
SSI	Surgical site infection
NC	Non-compliances
RCA	Route cause analysis
CAPA	Corrective and preventive Actions
ICU	Intensive care unit
ALS	Average length of stay
HCW	Health Care worker
HICC	Hospital Infection Control Committee
PEP	Post exposure prophylaxis

CHAPTER 1- BACKGROUND

A health indicator is a metric that summarizes data on these important topics in public health and the effectiveness of the healthcare system. Health data and utilization of comparable and effective data across geographic, organizational, and administrative boundaries, as well as the ability to track your progress over time (Wilm Quentin).

Quality of care is highly variable and delivered by a system that is too often poorly coordinated, driving up costs, and putting patients at risk (Patient Safety and Quality: An Evidence-Based Handbook for Nurses).

The indicators of clinical performance and outcomes that can be used with easily accessible in-patient hospital data to assess and track clinical performance and outcomes are standard, evidence-based quality-of-care indicators (Measuring healthcare quality).

The hospital infection, also called the Nosocomial infection, is an infection that is marketed at a hospital or other medical facility. Infections can be contracted at a hospital, nursing home, rehabilitation centre, outpatient clinics, diagnostic laboratories, or other therapeutic settings. The patient's safety is jeopardized by health-care-associated infections (HAIS) (I).

A blood infection associated with the central wire, urinary tract infections associated with catheter-associated pneumonia associated with ventilation, infection of the site of the needle puncture injury, and infections that may occur at surgical sites, also known as an infection of the surgical site, are all examples of health-related infections (HAIS). These indicators' work is critical in controlling and preventing healthcare-associated infections, which holds a major risk to the patient's safety (II).

Quality is an indicator of the tools can be used to continually improve the effectiveness of the quality management in the hospital setting. This includes customer feedback, internal quality audits, and corrective precautions in order to meet the required standards. The methods that will be used for the CQI, the-check-act-Plan, i.e., the PDCA-cycle, six sigma, lean, and TQM (Improving healthcare quality) (2).

The work of these indicators is crucial in preventing and controlling healthcare-associated infections, which pose a significant risk to the patient's safety.

1.1 INTRODUCTION

A health management organization (HCO) is an intrinsically complicated organization that functions as an intangible asset and brings together a variety of professional staff. The medical care system's quality is tied to the policy's quality. However, quality is not an attribute of a physical entity.

A high quality health care defined as “one that is accessible, appropriate, available, affordable, effective, efficient, integrated, safe, and patient related (National Accreditation Board for Hospitals and Healthcare Accreditation System for healthcare sector in India: An overview)”

Experts in several medical devices, including obstetrics, medicine, nursing, dentistry, and obstetrics, neuroscience, psychology, and other health professionals, provide medical treatment.

The term "quality management" in the context of health care has a fairly broad definition. It was formerly thought to be in the field of health-care personnel management (1). However, the conventional meaning is that the care process is being managed. It relates to the management of organizational characteristics, as well as the assessment of procedures and processes that could be resolved individually or collectively by a group of health care professionals’.

It is critical that the services supplied to patients are of the highest quality. The traditional perspective of quality control focuses on identifying faults, whereas the doing focuses on the fault in order to avoid continual improvement of processes and outcomes-based systems that respond to the patient's demands. As a result, there is a pressing need for a shift in the medical care quality paradigm (2).

The goal of this study is to achieve the minimum criteria established by the care quality indicators by implementing the hospital's performance in various important areas.

In the structure of the health-care system, the rules for providing an effective programme for the prevention and control of health-related infection. This initiative has been documented and has been aimed at reducing or eliminating infectious hazards to patients, healthcare workers, health-care users, and providers.

The company will take the appropriate precautions and procedures to prevent or limit the risk of healthcare-associated infections in both patients and employees.

The Organization provides appropriate techniques and means for infection support. Program for prevention and control.

What is quality in hospital [according to NABH and JCI]?

National and international accreditation and certifications like NABH and JCI are considered prestigious acknowledgements of the healthcare quality as they substantially improve the safety and quality of care and services provided for large, medium and small healthcare organizations (Accreditations). Quality standards form the basis of an objective evaluation of the process that can help health organizations measure, assess and to improve performance (Accreditations; Accreditations).

Role of Hospital Infection Control Committee (HICC) in prevention of infection and improving performance

Members- The members of HICC are responsible and concerned health-care providers. Asian Heart Institute's administration and management have had a clear goal to accomplish quality care standards by establishing an effective infection control programme from the institute's foundation.

The Infection Control Program at Asian Heart was created with specific goals and objectives in mind to assist in providing high-quality healthcare to patients while also ensuring the safety of health-care workers and protecting the environment and community. The infection control team is in charge of dealing with day-to-day issues. It also oversees the hospital staff's educational and training initiatives. The Department of Microbiology is in charge of the day-to-day operations and surveillance efforts, with the Infection Control Nurses assisting them.

Hospital infection control committee at Asian Heart consist of:

Chairman: Medical Director

Members-

- Hospital administrator
- Microbiologist & Infection control officer
- Cardiologist
- CVTS Surgeon
- Consultant Anaesthetist
- Nursing Director and Nursing Team leaders

- Infection Control Nurse
- CSSD Manager
- Housekeeping Supervisor
- Quality Coordinator

Responsibilities of infection control team-

Advise staff on all aspects of infection control and maintain a safe environment for patient and staff. Advise management about at risk patient. Carry out targeted surveillance of HAI and act upon data obtained e.g. investigates clusters of infections above expected levels. Investigate outbreaks of infection and take corrective actions to curb the spread. Provide relevant information on infection control to management. Assist in training of all new employees as to the importance of infection control and all relevant policies and procedures. Overlook the appropriate implementation of biomedical waste management. Supervision of isolation procedures. Plan, organize, develop and implement educational programs for all hospital employees including administrative and ancillary services. To conduct a programme of audit and surveillance. Development of policies and procedures to insure rigorous infection control standards that meet JCI, NIAHO ISO and Centre for Disease Control requirements.

HEALTHCARE ASSOCIATED INFECTIONS

The following are quality indicators for HAI used in this study to assess and analyse the infection rate in various department of hospital-

A. Catheter associated Urinary tract infection (CA-UTI)

A urinary tract infection (UTI) is an infection of the bladder and kidneys. If you have a urinary catheter, bacteria can migrate along it and create an infection in your bladder or kidney, which is known as CAUTI (Catheter-associated Urinary Tract Infections (CAUTI)).

A urinary tract infection (UTI) is an illness that affects the kidney, ureters, bladder, and urethra, among other parts of the urinary system. It is a fairly common type of infection detected in individuals who have been confined to the hospital for a long time or who have been using a urinary catheter for a long time. Approximately 75% of UTIs acquired in the hospital are linked to a urinary catheter, which is a tube put into the bladder through the urethra to drain urine. As a result, catheters should only be used for certain indications and should be withdrawn as soon as the patient no longer requires them.

The involvement of nursing staff in infection prevention is critical. Every shift during the day, catheter care must be conducted. Regular catheter care aids in assessing the state of the catheter as well as keeping track of the infection through the use of aseptic procedures.

B. Ventilator associated pneumonia (VAP)

A ventilator may be life saving to the patients but it can be fatal thus it introduces the inner lining of the organ and may involve infective foreign bodies. Ventilator associated pneumonia occurs in the patient who are intubated as well as on mechanical ventilator at the time of or within 48 hours before the onset of the pneumonia (Ventilator-associated Pneumonia (VAP)). VAP may commonly occur in a person who is on ventilator for breathing support. Ventilator associated pneumonia majorly affects the critically ill patients who are admitted in ICU.

VAP may lead to increase risk of serious illness or death. The most normal reason for VAP is the miniature goal of microorganisms which colonize the oropharynx and the upper aviation routes in terminally and truly sick patients. Infection and Microbiologic

Surveillance- Conducting surveillance for bacterial pneumonia in intensive care unit (ICU) patients who are at high risk for health-care related bacterial pneumonia (e.g., patients with mechanically assisted ventilation or selected postoperative patients) to determine trends and help identify outbreaks and other potential infection-control problems

Care of patients with tracheostomy-

- Regular suctioning of respiratory tract emissions observing standard precautionary measures
- wearing sterile instead of clean gloves when performing endotracheal suctioning
- Use sterile clean liquid to eliminate discharges from the tracheostomy catheter if the catheter is to be utilized for re-emergence into the patient's lower respiratory tract.

C. Central line associated bloodstream infection (CLABSI)

A dangerous infection caused by the entry of micro organisms into the bloodstream through a central line is known as a central line associated bloodstream infection. The goal of tracking the CLABSI rate is to reduce the number of catheter-related bloodstream infections in patients who have been using central intravenous catheters for a long time.

Medical management of CLABSI-

Following are the catheter insertion practices

- Perform hand cleanliness before insertion.
- Adhere to aseptic method.
- Utilize maximal sterile barrier safety measures (i.e., veil, cap, outfit, sterile gloves, and clean full body wrap).
- Choose the best insertion site to limit diseases and non-irresistible entanglements dependent on singular patient attributes.
- Stay away from femoral site in fat grown-up patients.
- Prepare the insertion site with >0.5% chlorhexidine with liquor.
- Place a sterile cloth dressing or a clean, straightforward, semi porous dressing over the insertion site. For patients 18 years old or more established, utilize a chlorhexidine impregnated dressing with a FDA cleared mark that determines a clinical sign for decreasing CLABSI for transient non-tunneled catheters except if

the office is showing accomplishment at forestalling CLABSI with benchmark counteraction rehearses.

- Handle and keep up focal lines fittingly Follow hand cleanliness necessities.
- Wash ICU patients more than 2 months old enough with a chlorhexidine planning consistently.
- Scrub the entrance port or center point with grating promptly preceding each utilization with a proper germ-free (chlorhexidine, povidone iodine, an iodophor, or 70% liquor).
- Utilize just sterile gadgets to get to catheters. Quickly supplant dressings that are wet, dirtied, or ousted.
- Perform routine dressing changes utilizing aseptic strategy with perfect or sterile gloves.
- Change cloth dressings somewhere around like clockwork or semi porous dressings something like at regular intervals.
- For patients 18 years old or more established, utilize a chlorhexidine impregnated dressing with a FDA cleared name that determines a clinical sign for lessening CLABSI for transient non-burrowed catheters except if the office is showing accomplishment at forestalling CLABSI with pattern avoidance rehearses.
- Change organizations sets for consistent implantations no more much of the time than like clockwork, however something like at regular intervals.
- If blood or blood items or fat emulsions are controlled change tubing at regular intervals.
- If propofol is managed, change tubing each 6-12 hours or when the vial is changed.
- Promptly eliminate superfluous focal lines.
- Perform day by day reviews to survey whether every focal line is in appropriate condition.

D. Surgical site infection (SSI)

Surgical site infection (SSI) is a skin or subcutaneous tissue infection that starts within 30 days of the procedure and affects just the skin or subcutaneous tissue around the incision. The goal of SSI monitoring is to reduce patient length of stay, which is linked to major morbidity and mortality, as well as increased treatment costs.

Preoperative precaution-

- Patient baths or showers before operative procedure with plain or antimicrobial soap
- Use 2% mupirocin decolonization in known nasal carriers of staphylococcus aureus in cardiac and orthopaedic surgery
- Remove patient hair with clipper only, do not shave
- Administer surgical antibiotic prophylaxis in the 120 minutes preceding surgical incision
- Prepare the hand before surgery by scrubbing using the correct technique with a suitable microbial soap and water or alcohol based hand rub
- Do not discontinue immunosuppressive medication
- Clean and sterilize surgical equipment
- Clean and prepare operating room environment.

Intra-operative precaution-

- Use disposable sterile non woven or reusable sterile woven drapes and surgical gown
- Do not use plastic adhesive incise tape
- Use alcohol based solution containing chlorhexidine gluconate for skin preparation
- Consider irrigating incisional wound with an aqueous povidone iodine solution before closure
- Do not perform antibiotic wound irrigation
- Consider using wound protector devices
- Consider prophylactic negative pressure wound therapy
- Maintain asepsis in operating room.

Post operative precaution-

- No not prolong surgical antibiotic prophylaxis in the postoperative period
- Remove wound drain when clinically indicated
- Evaluate and manage wound appropriately, including cleansing, dressing and care according to the given wound situation
- Follow five moments of hand washing to prevent cross infection.

E. Incidence of needle stick injuries

NSI is a penetrating stab wound from a needle that may result in exposure to blood or other body fluids. It is caused by needle that accidentally puncture the skin.

NSI assessment identifies unsafe practices that may lead to infections, such as whether the critical steps of an injection administration are executed. It also estimates the proportion of health care facilities where injection practices are safe.

Three major considerations are especially relevant in the assessment of potential unsafe injections practices:

- 1) Safety of the injection recipient,
- 2) Safety of the health care worker, and
- 3) Safety of the community.

Recommendations following an assessment should focus upon these considerations in regard to injection safety interventions.

The objectives of an injection safety assessment are:

- 1) To see if a facility where injections are provided complies with the necessary standards for staff competency, equipment, supplies, and waste disposal.
- 2) To see if the crucial steps of an injectable administration are carried out in accordance with best practises.
- 3) To identify unsafe practises that can lead to infections and should be targeted by interventions aimed at improving injection safety and occupational health.
- 4) Determine the percentage of health-care facilities where injection techniques are considered safe.
- 5) Determine whether policies and practises exist to safeguard healthcare workers from avoidable exposures to sharps and blood-borne diseases, as well as whether post-exposure surveillance, follow-up, and prophylaxis.
- 6) Determine how common needle stick injuries from contaminated sharps are among injection providers and waste handlers.
- 7) To calculate out what percentage of needle stick injuries aren't reported.

Safety protocols for needle stick injury-

1. Injection safety

For each injection, use a sterile, single-use, disposable needle and syringe, which should be discarded intact in a sharps container after use. When possible, use single-dose drug vials, pre-filled syringes, and ampoules. Do not combine leftover contents from single-dose vials for later use or deliver drugs from single-dose vials to multiple patients. Multi-dose vials should be avoided at all costs. If the sterility of the vials is compromised, discard them according to the manufacturer's instructions. Do not use bags or bottles of intravenous solution as a common source of supply for multiple patients. Avoid contaminating sterile injectable equipment and drugs by using aseptic approach.

2. Patient-care equipment

- Handle blood-contaminated patient-care equipment in a way that avoids skin and mucous membrane exposure, clothing contamination, and the spread of bacteria to other patients and surfaces.
- Examine equipment and devices for the possibility of blood cross-contamination.
- Establish procedures for safe handling before, during, and after use, including cleaning, disinfection, and sterilization, if needed. Dispose of spent syringes and needles in a puncture-resistant, leak-proof sharps container that can be shut before it becomes totally full. Keep clean and infected equipment and supplies separated by a physical barrier. Prepare drugs in a separate location from anyone who may be exposed to blood.

F. Compliance to hand hygiene practice

How and when to perform wash washing?

The steps given below for hand washing as per WHO and NABH guidelines are to be followed to reduce the contamination and spread of infection.

Duration of hand washing-

For Soap and water 40 – 60 sec and with hand rub -20 -30 sec

Types of Hand washing-

a. Routine Hand washing

The aim of routine hand washing is to remove the transient bacterial flora. These organisms may be acquired from another person's skin or from objects in the environment.

b. Procedural Hand wash

An alcoholic hand rub solution use should be encouraged. If the hands are heavily contaminated then routine or surgical hand wash must be performed.

Alcohol hand rub solution are only effective for use when hands are physically clean therefore routine hand washing is recommended in addition in hygienic hand washing

c. Surgical Hand wash: Prior to all surgical procedures, prior to other invasive or diagnostic procedures, e.g. insertion of a central venous catheter or lumbar puncture.

Key pointer to remember before hand washing-

- Keep clothing away from sink and splashes.
- Remove wear jewellery.
- Turn on water and adjust temperature for your comfort.
- Wet hands and apply approximately 1 teaspoon of soap to hands. Lather well (soap reduces surface tension enabling the removal of bacteria)
- Wash hands thoroughly, using the following steps to facilitate eradication of all bacteria.

Steps of hand washing-

1. Palm to palm
2. Palm over dorsum, left over right, right over left,
3. Palm to palm, finger interlaced.
4. Back of fingers to opposing palms.
5. Rotate thumbs in palm.
6. Rotate fingers in palm
7. Rotate palm on both wrists
8. Rinse hand under running water
9. Thoroughly dry hands with a clean paper towel.

If electronically or elbow operated taps are not available. Taps should be turned off using a dry paper towel ensuring hands are not re-contaminated.

Repeat hand washing technique whenever necessary (to prevent recontamination of hands).

Figure 1.1- Steps of hand washing



Source- <https://www.who.int/campaigns/world-hand-hygiene-day/2021>

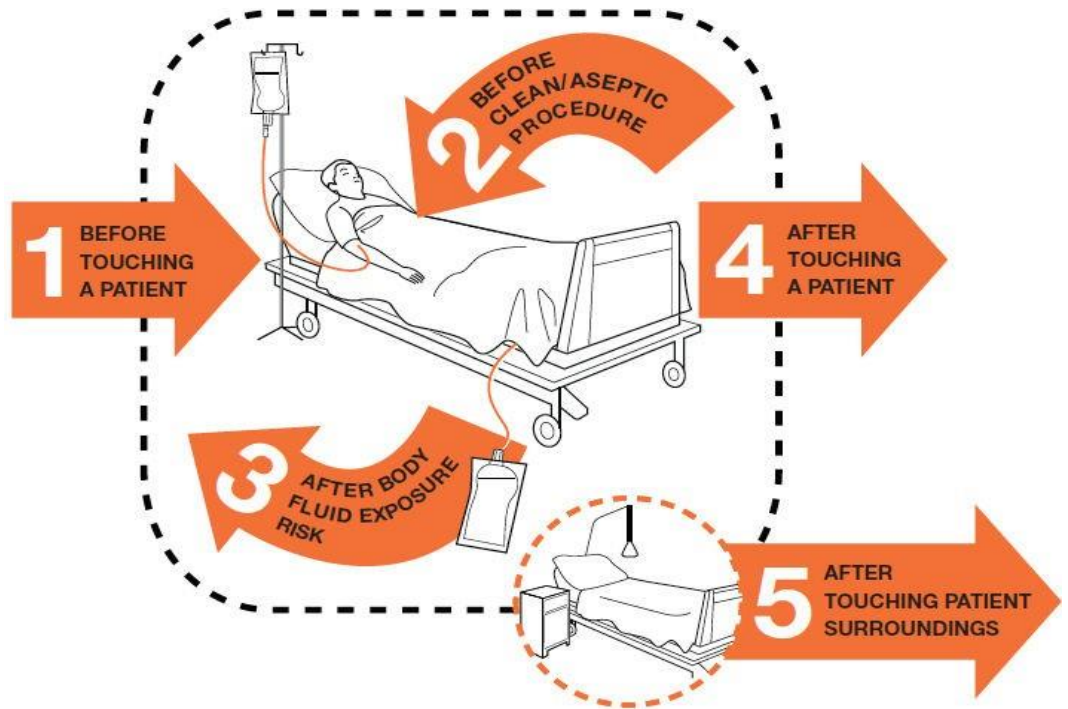
Five Moments of Hand washing-

“My five moments for hand hygiene” (Figure 1.2) is proposed as the reference approach for the appropriate performance, teaching and evaluation of hand hygiene; it does not define specific or multiple procedures and care situations, but it helps to focus on essential moments embedded within the care sequence that are essential for hand hygiene. It is a tool to identify moments when hand hygiene should be performed.

- 1. Before touching a patient-** To protect the patients and healthcare personnel against harmful germs or/ and bacteria carried on the hands.
- 2. Before clean/aseptic procedures-** To protect the patients and healthcare personnel against harmful germs including the patient’s own from microorganisms from entering his/her body.
- 3. After body fluid exposure or risk-** To protect the healthcare environment from harmful bacteria

4. **After touching a patient-** To protect the healthcare environment and other staff/ personnel from harmful bacteria
5. **After touching patient surroundings-** To protect the staff and other staff from getting cross infection

Figure 1.2-Five moments of hand washing



Source-<https://www.who.int/teams/integrated-health-services/infection-prevention-control/hand-hygiene/monitoring-tools>

The following are Quality indicators used to assess and analyse the hospital performance based on NABH and JCI

- Reduce risk of hospital acquired infection-
= Total Nosocomial infection/ Total admissions * 100
- Preventing patient falls-
= Number of falls / Total number of patient days * 1000
- Bloodstream infection rate -
= Number of Central Line associated blood stream infection in a month / Number of Central Line days in that month * 1000
- Surgical site infection rate-
= Total number of Surgical site infection in month / Number of surgeries performed in a month * 100
- Urinary tract infection rate-
= Number of catheters associated urinary tract infection in month / Number of urinary catheter days in that month * 1000
- Pneumonia rate -
= Total number of ventilators associated pneumonia in month / Number of ventilator days in month * 1000
- Incidence of needle stick injury-
= Number of parenteral exposure / numbers of inpatient days * 1000
- Reintubation rate-
= Number of reintubation within 48 hours of extubation / Number of intubations * 100
- Return to ICU within 48 hrs-
= Number of returns to ICU within 48 hrs / Total number of discharges or transfers or deaths * 100
- Incidence of hospital associated pressure ulcer after admission-
= Number of patient who developed bed sore / total number of patient days * 100
- Mortality rate-
= Number of deaths / numbers of discharge and death * 100
- Return to ICU within 48 hours-
= Number of returns to ICU within 48 hrs / Number of discharge or death in ICU * 100
- Average length of stay-
= Number of inpatient days in every month / Number of available bed days in that month * 100

❖ **Research question-**

What are the challenges and compliance of various quality indicators for infection control being measured for the continuous quality improvement at Asian Heart Hospital, Mumbai as directed by JCI and NABH.

❖ **Objectives-**

1. To study the quality indicators for infection control in the hospital
2. To collect, compile and study the data on quality indicators related to infection control.
3. To evaluate the data for outliers and finding out the Non- compliances, their challenges and rationale
4. To recommend suggestions to eliminate the errors to improve the quality performance and elevating compliances.

CHAPTER 2- REVIEW OF LITERATURE

Sr no	Authors (Published year)	Study location	Sample size	Sampling technique	Salient feature
1	Title-A Descriptive Study of Nosocomial Infections in an Adult Intensive Care Unit Year- 2011-12 Author- Keshni Naidu, IlisapeciNobose Sharan Kerri, Viney, Sten M. Graham	Colonial War Memorial Hospital Hindawi, (CWMH) in Suva, Fiji	114 Patients	Type of study- retrospective, descriptive study Study duration- 1 year Data collection (mode)- Infection control surveillance records and ICU patient's records crossed checked with microbiology lab records.	The commonest locales of disease were respiratory parcel and circulation system contaminations, and Gram-negative microorganisms were the principle microbes detached from ICU patients. These discoveries are steady with different examinations from agricultural nations. Mortality was exceptionally high among these ICU patients with nosocomial diseases. High mortality has been recently revealed from non-industrial nations ICUs.

2	Title- Knowledge and practices of nurses regarding nosocomial infection control measures in private hospitals in Sana'a City, Yemen Year-15th December 2015 Authors- GamilAlrubaie, AnisahBaharom, Hayati Kadir Shahr, Shaffe Mohd Daud & Huda Omar Basaleem	Private hospitals in the capital city of Yemen	100 Nurses	Type of study- Descriptive cross-sectional study Study duration- April to May 2016 Data collection (mode)-45 Questionnaires	The holes in information and works on with respect to NI control measures show the need to build up a connected medical services strategy in regards to NIs and execute an ordinary preparing project to overhaul and invigorate the attendants' information and works on in regards to NI control measures.
3	Title - A study of risk factors for catheter associated urinary tract infection.	Department of Urology, Kilpauk Medical College, The Tamil Nadu Dr.	210 patients	Type of study- Prospective study Study duration- September 2012 to February 2014.	A comprehension of the danger factors being developed of CAUTI, fundamentally helps in decreasing the extra weight on the

	Year- 13 February 2018 Author- Leelakrishna P, Karthik Rao B	MGR Medical University, Chennai, Tamil Nadu, India		Data collection (mode)- Urine culture sample	medical services framework. Measures like shortening the term of catheterization, exacting control of diabetes and sterile insurances in addition and support of inhabiting catheters can help in anticipation CAUTI.
4	Title- Knowledge, attitude and practice of standard precautions of infection control by hospital workers in two tertiary hospitals in Nigeria Year- January 5, 2015 Author- Kemebra dikumo Pondei, Babatunde Adetunji, George Chima,	Tertiary hospitals in Nigeria	290 HCW	Type of study- Prospective, Qualitative study Study duration- 1 year Data collection (mode)- structured self-administered questionnaire	Results propose commonly helpless consistence with standard precautionary measures of disease control among HCW in Nigeria. Strategies that encourage preparing of HCW in standard precautionary measures and assurance normal arrangement of contamination control and anticipation assets in wellbeing offices are needed in Nigeria.

5	Title- Pediatric Ventilator-Associated Infections: The Ventilator-Associated Infection Study Year- January 2017 Author- Willson, Douglas F, Hoot, Michelle PhDKhemani, Robinder MS, Carrol, Christopher, Kirby, Aileen, Schwarz, Adam, Gedeit, Rainer, Nett, Sholeen, Erickson, Simon, Flori, HeidiHays, SpencerHall, Mark.	United states, Canada, Australia	47 PICU in the	Type of study- Prospective, Observational, cohort study Study duration- Data collection (mode)- Culture of respiratory secretion in paediatric patients	The positive culture of the samples was primary determinant of continued antibiotic treatment in those children with suspected ventilator associated infection. Positive culture is not associated with worse outcomes irrespective of antibiotic treatment however the lower mortality in treated subject with endotracheal tube is significant. The importance of continuing antibiotics for a positive respiratory culture in suspected ventilator associated infection requires further implementation
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6	Title: Using quality measures for Quality Improvement: the perspective of hospital staff. Year- Jan 2014 Authors- Asgar Aghaei, Hashjin, Hamid Ravaghi, Dionne S Kringos, Uzor Ogbu, Claudia Fischer, Saeid Reza Azami, Niek S Klazinga	Country- Iran	160 clinical and non-clinical staff in 48 Iranian Hospitals	Type of study- Cross sectional Study area- Iranian Hospitals Study duration- 1 year (2009-2010) 3.4 Data collection (mode)- self-administered questionnaire	Clinical cycle and viability markers were accounted for to be least utilized. Quality pointers were accounted for to be utilized among clinical staff altogether more than among administrative staff.
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STUDY FRAMEWORK

Objectives	Indicators	Tools
To study the quality indicators for infection control in the hospital	- Quality indicators - Quality care	Google search
To collect, compile and study the data on quality indicators related to infection control.	- Data analysis and interpretation	[PubMed] [Google 20scholar]
To evaluate the data for outliers and finding out the Non-compliances, their challenges and rationale	- Non compliances - Challenges to meet compliances	[PubMed] [Google 20Scholar]
To recommend suggestions to eliminate the errors to improve the quality performance and elevating compliances	- Training and upskilling of staff - Suggestions and guidelines	Google search

CHAPTER 3- RESEARCH METHODOLOGY

Type of study- Retrospective, descriptive study.

Study area – In-patient's area v.i.z., wards and ICU

Sample size- Total number of inpatient in year 2019 were 2098

Study duration – 3 months (March 2021 to May 2021)

Data collection (mode)-A primary data collected from the admitted patient's records, HMIS, bundle tools and Incidents reporting forms for CAUTI, CLABSI, SSI and Needle stick injury forms and hand hygiene practice record.

Research approach- Quantitative data

Materials and Methods

This study was conducted based on secondary data which is taken from the various inpatient departments to understand the non-compliance and trend analysis of retrospective data. The quality indicators given in HIC, PCI by NABH and JCI respectively are studied for justifying the research objectives.

Data mentioned in the study is captured from the incident reports, HMIS records, and inpatient records applying the quality indicators given by JCI and NABH modules for prevention and control of infections to know that infection control policies are documented and implemented. The captured raw data is verified against the definition and formula given by standards. The numerator and denominator of each indicator is verified by understanding the given standards.

The trend analysis and interpretation is done by the collected and compiled data in tabular form and henceforth creating graph for previous 12 months of data. The data is set in the numerator and denominator for each indicator to check the non-compliances which is going against the benchmark decided by the organization for those quality indicators.

The non-compliance is observed and analyzed for their cause of specific indications. RCA and CAPA is done for each NCs in order to eliminate the reoccurrence. Departmental audit and interaction is done in the department to understand their challenges and root cause analysis of the incidences. Corrective and preventive action thus taken to eliminate the reoccurrence and to close the NCs by the hospital.

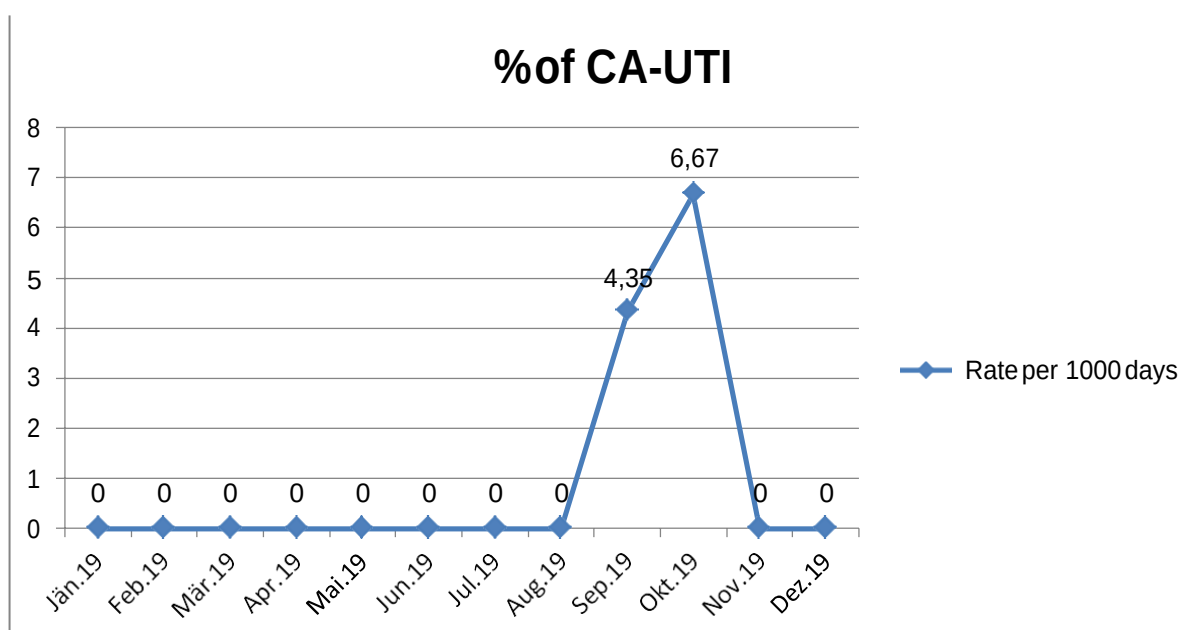
CHAPTER 4- DATA ANALYSIS AND INTERPRETATION

Quality Indicators

Table 4.1 -Catheter associated Urinary tract infection (CA-UTI) rate

Catheter associated Urinary tract infection (CA-UTI) rate			
Months	Total number of CA-UTI cases in a month	Total number of urinary catheter days in a month	Rate per 1000 days
Jan-19	0	421	0
Feb-19	0	480	0
Mar-19	0	402	0
Apr-19	0	325	0
May-19	0	232	0
Jun-19	0	250	0
Jul-19	0	230	0
Aug-19	0	250	0
Sep-19	1	230	4.35
Oct-19	2	300	6.67
Nov-19	0	280	0
Dec-19	0	330	0

Figure 4.1 - Catheter associated Urinary tract infection (CA-UTI) rate



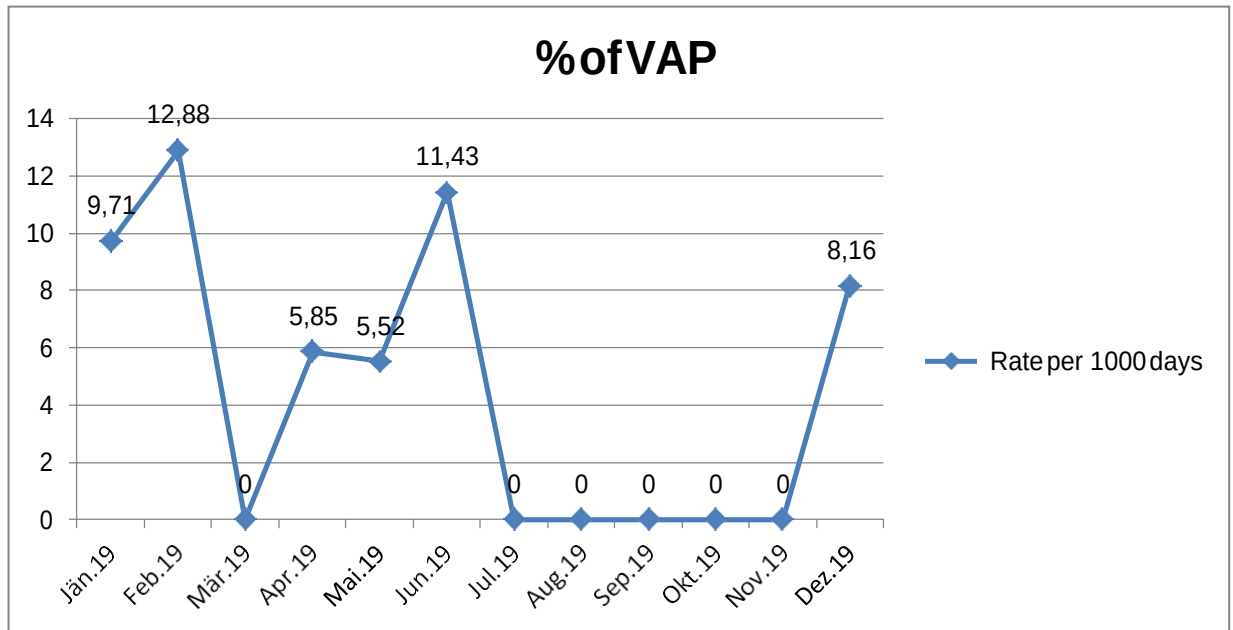
- **Benchmark as per International Nosocomial Infection Control Consortium - 6.1 per 1000 device days**
- **Internal benchmark : zero**

Interpretation- Above fig. shows that there are total 3 incidences in the month September and October in the IPD. Rationale for the CAUTI was poor catheter care and prolonged length of stay of the patient. According to hospital internal benchmark it is observed that staff are aware about the Infection caused by catheter to the patients as the maximum rate shows 0% infection rate.

Table4.2.-Ventilator associated pneumonia.

Ventilator associated pneumonia (VAP) rate.			
Months	Total number of VAP cases in a month	Total number of ventilator days in that month	Rate per 1000 days
Jan-19	2	206	9.71
Feb-19	3	233	12.88
Mar-19	0	168	0.00
Apr-19	1	171	5.85
May-19	1	181	5.52
Jun-19	2	175	11.43
Jul-19	0	140	0.00
Aug-19	0	202	0.00
Sep-19	0	140	0.00
Oct-19	0	135	0.00
Nov-19	0	145	0.00
Dec- 19	2	245	8.16

Figure 4.2



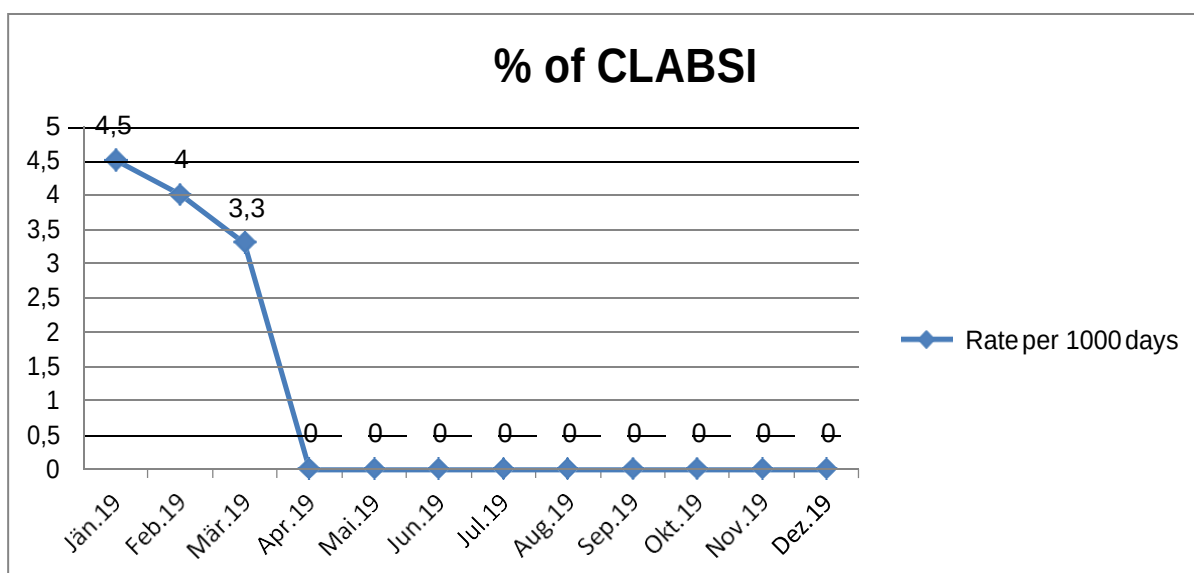
- **Benchmark as per International Nosocomial Infection Control Consortium – 14.7 per 1000 ventilator days**
- **Internal benchmark : zero**

Interpretation- There is increased rate of VAP in the month of January, February, April, May, June, and December, whereas February and June has highest rate of VAP. After highest occurrence of infection in the June strict audit was conducted and training is given assessing the knowledge gap to curb the spread of infection. Other causes for VAP were poor tracheostomy care and non compliance of hand hygiene.

Table 4.3 -Central line associated bloodstream infection (CLABSI)

Central line associated bloodstream infection (CLABSI) rate			
Months	Total number of CLABSI cases in a month	Total number of central line days	Rate per 1000 days
Jan-19	2	440	4.5
Feb-19	2	500	4.0
Mar-19	1	300	3.3
Apr-19	0	320	0.0
May-19	0	400	0.0
Jun-19	0	340	0.0
Jul-19	0	300	0.0
Aug-19	0	345	0.0
Sep-19	0	321	0.0
Oct-19	0	300	0.0
Nov-19	0	330	0.0
Dec-19	0	380	0.0

Figure 4.3- Central line associated bloodstream infection (CLABSI)



- **Benchmark as per International Nosocomial Infection Control Consortium - 7.4 per 1000 device days.**

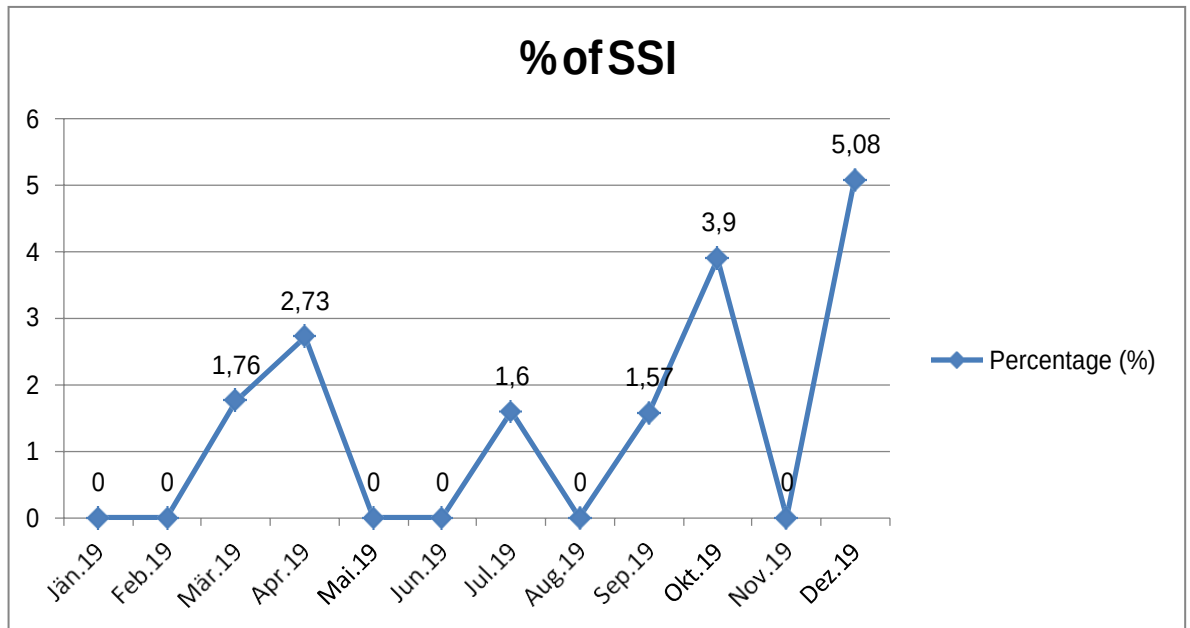
- **Internal benchmark : zero**

Interpretation-There are 5 incidences reported of CLABSI in initial 3 consecutive months of 2019. Henceforth the departments were informed about the infection rate, CAPA is done and thereafter the NCs were closed.

Table 4.4 -Surgical site infection (SSI) rate

Surgical site infection (SSI) rate			
Months	Total number of surgical site infections	Total no. of surgeries performed in a month	Percentage (%)
Jan-19	0	85	0
Feb-19	0	82	0
Mar-19	1	76	1.76
Apr-19	2	73	2.73
May-19	0	79	0
Jun-19	0	70	0
Jul-19	1	60	1.60
Aug-19	0	71	0
Sep-19	1	57	1.57
Oct-19	2	54	3.90
Nov-19	0	71	0
Dec-19	3	59	5.08

Figure 4.4-Surgical site infection (SSI) rate



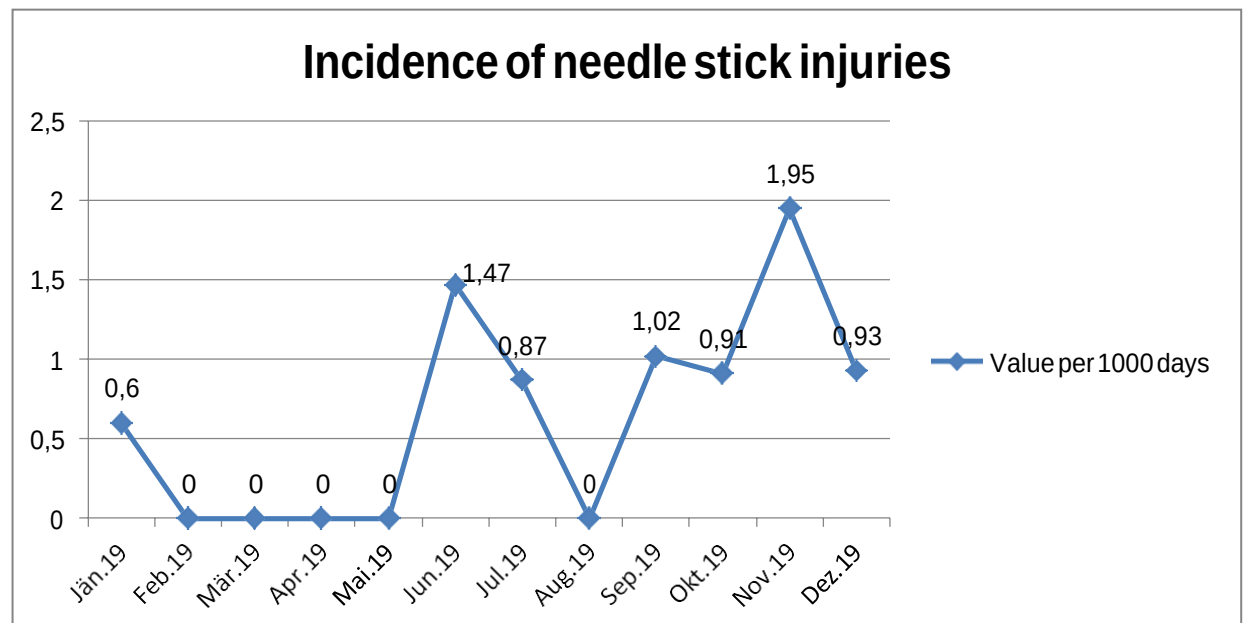
- **Benchmark as per International Nosocomial Infection Control Consortium - 3 %**
- **Internal Benchmark - Zero**

Interpretation- The above data shows a greater number of SSI, as mostly patients who are admitted in the hospital are the postoperative cases. The multiple rationale for SSI could be because of poor hand hygiene, poor surgical site and postoperative care.

Table 4.5- Incidence of needle stick injuries

Incidence of needle stick injuries			
Months	No of blood body fluid exposures in IPD areas	No. of in-patient days	Value per 1000 days
Jan-19	1	1663	0.60
Feb-19	0	1786	0
Mar-19	0	1319	0
Apr-19	0	1556	0
May-19	0	1122	0
Jun-19	2	1353	1.47
Jul-19	1	1142	0.87
Aug-19	0	1282	0
Sep-19	1	975	1.02
Oct-19	1	1088	0.91
Nov-19	2	1028	1.95
Dec-19	1	1066	0.93

Figure 4.5- Incidence of needle stick injuries



Internal Benchmark- 0%

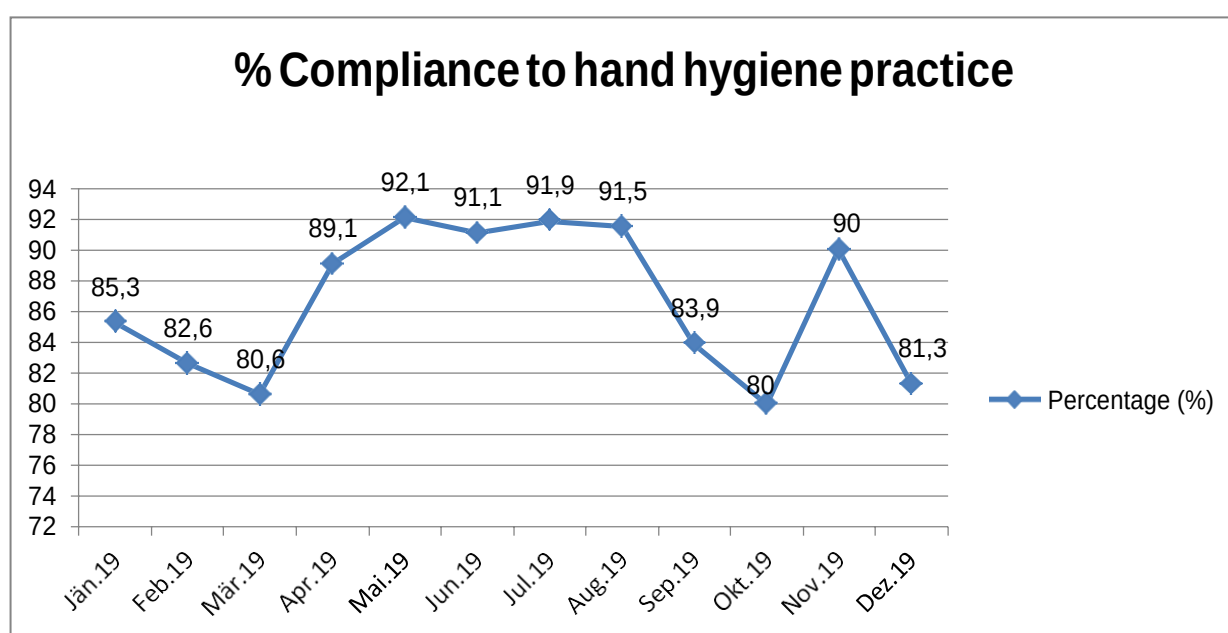
Interpretation- The data shows there are total 9 incidents of needle stick injury which is seen in the month of January, June, July, and consecutively in September, October,

November, December. Although the hospital's internal benchmarking suggest there should be zero percent rate of infection.

Table- 4.6-Compliance to hand hygiene practice

Compliance to hand hygiene practice			
Months	Observed hand hygiene episodes	No. Of hand hygiene opportunities	Percentage (%)
Jan-19	1995	2340	85.3
Feb-19	1785	2160	82.6
Mar-19	1885	2340	80.6
Apr-19	1925	2160	89.1
May-19	1160	1260	92.1
Jun-19	2050	2250	91.1
Jul-19	2150	2340	91.9
Aug-19	2140	2340	91.5
Sep-19	1885	2248	83.9
Oct-19	1800	2250	80.0
Nov-19	2015	2240	90.0
Dec-19	1830	2250	81.3

Figure 4.6- Compliance to hand hygiene practice



Internal Benchmark- 90%

Interpretation- The non-compliances are continuously observed in the year 2019. Highest rate of NCs were found consecutively in a month of January, February, March, September, October and December. As per hospital policy benchmark for hand hygiene should be above 90%.

CHAPTER 5- RESULT AND CONCLUSION

Result:

Total six quality indicators were studied (i.e. CAUTI, VAP, CLABSI, SSI, NSI, Hand hygiene) which showed correlation with each other. Variation in one indicator was influencing performance of another indicator. Non-Compliance of Hand Hygiene and lack of training of clinical staff are causative factors for HAI.

The analysis of data on HAI indicators shows that hospital in this study is performing above industry benchmark set by international standards however the performance is comparatively on lower side based on benchmark set by internal quality department of hospital.

Conclusion:

Patient fulfillment is the attractive result of value confirmation program that requires patient-jogged care conveyance and furthermore the consistence with the principles and effective conventions.

This examination gives significant benchmark information on disease control markers that firmly recommends that the contamination control practices can be improved. There are known intercessions which help in decreasing the weight of medical clinic procured disease in ICU and Wards. Their requirements could be improved chronicle and continuous observation to follow along and screen the weight of diseases and assess the mediations which can forestall Nosocomial contaminations and diminishing the danger of infection.

CHAPTER 6- RECOMMENDATIONS

Fore Primary Contamination Control Moves to Control Transmission

- Hand hygiene
- Personal protective equipment (gloves, gowns and aprons)
- Isolation where required
- Proper handling and decontamination of patient care equipment
- Proper handling of patient care environment.

Immunization of Health Care Worker (HCW) :

Each health care worker (HCW) shall ensure that his or her immunization status is correct and appropriate. In addition, the following immunizations are recommended.

- a. Tetanus Immunization: If primary immunization is over, a booster dose is recommended after every ten years.
- b. Hepatitis B Vaccination: All doctors, nurses, paramedical staff, ward boys and house-keeping staff who have not received the vaccine will be given the complete series of the Hepatitis B vaccine, i.e., 3 doses of intramuscular vaccine at 0,1 and 6 months intervals.

For staff with history of partial or incomplete vaccination the following protocol should be followed:

- Received first dose but did not receive subsequent vaccinations- Administer the second dose as soon as possible, and subsequently. Administer the third dose at an interval of at least 8 weeks.
- Received first dose and second dose according to the vaccination schedule, but third dose was not received or delayed later than the 7th month- Administer the third dose and check for HBsAg antibody titres two months after this third dose.
- One to 2 months after completion of the 3-dose vaccination series, HCWs should be tested for antibody to Hepatitis B surface antigen (anti-HBsAg).
- Revaccinated persons should be retested at the completion of the second vaccine
- Series for anti-HBs titre. If their anti-HBs titre is still less than 10mIU/mL, then they are considered as primary non-responders.
- Primary non-responders to vaccination who are HBsAg-negative should be considered susceptible to HBV infection and should be counselled regarding precautions to prevent HBV infection and the need to obtain HBIG prophylaxis for any known or probable parenteral exposure to HBsAg-positive blood.

- HBsAg-positive HCWs should also be counselled accordingly.

Medical management after needle stick injury

Identifying the needle prick injury. DO NOT Squeeze the blood from the site, let it flow with gravity. Wash with soap and running water. Report to the day care staff immediately. Immediately a stat dose of post exposure prophylaxis (PEP) should be given to the employee who got the needle prick injury. The needle prick injury is cleaned with betadine and dressing done if clinically indicated. Injection T.T is given to the staff. Needles prick form to be filled up and to be sent to Infection Control doctor /ICN. Employee should do serology testing for HIV, HbsAg and HCV. The employee's blood sample is then collected in the laboratory for HIV, HbsAg and HCV testing. Check the HIV, HBsAg and HCV status of the source patient. If the source patient's sero-status is unknown, it is reasonable to start treatment immediately and later modify or discontinue accordingly. Follow up with Infection Control Doctor/ Nurse for coordination of post exposure treatment, evaluation and management If the Index case is HIV positive do the baseline testing for HIV antibodies and also test for HBsAg and HCV and start Post exposure prophylaxis (PEP) as per the assessment of the injury. In addition to the baseline testing for HIV, HBsAg and HCV of the employee should be instructed to come for follow –up testing for the above investigations at 6 weeks, 3 months and 6months.

Since the emotional impact of an exposure is substantial, counseling is done as of post exposure management. HIV exposed HCW's + should be advised to prevent secondary transmissions during the follow-up period by using a condom / abstaining from sex, avoiding pregnancy and refraining from donating blood, plasma, organs, tissues or semen. Exposed HCW's, who are nursing mothers must discontinue breast feeding and consult the doctor about risk of HIV transmission to the child. Exposed pregnant HCW's should be counselled on the benefits and risks of therapy in pregnancy. If the Index case is HbsAg positive: Test for- HIV, AntiHBs, HCV.

- [Anti HBs: <10 m IU/ml :HBIG(within 48 hrs)]+HB vaccine as the booster
- [Ant HBs:10-100mIU/ml]: Booster of the vaccine.
- [Anti HBs :>100m IU/ml]: No Immunoprophylaxis required. Only Reassurance

If index case is HCV positive- there is no effective PEP, Immunoglobulin does not prevent infection/ disease

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 4. NSI- https://www.who.int/occupational_health/activities/2needlest.pdf

ANNEXURE-I

HOSPITAL PROFILE

About Asian Heart Institute& Research Centre (AHIRC)

Asian Heart Institute situated at Bandra Kurla Complex, in the heart of Mumbai is the dream of leading Cardiac surgeon Dr.Ramakanta Panda. Asian Heart Institute, India's No. 1 Heart Care Hospital, was set up in Nov' 2002 with the aim to provide world-class cardiology and cardiac surgery services in India. Internationally Accredited with ISO 9001:2008 **[International Organisation for Standardization]**, JCI **[Joint Commission International]** & NABH **[National Accreditation Board of Hospitals and Healthcare Providers]**.

Asian Heart Institute is committed to high standards of professionalism and integrity.

Asian Heart today is India's highest accredited hospital. It is the first heart hospital in India to get JCI accreditation and first heart hospital to be accredited 5 times in a row by JCI.

It has been designed as per International Standards with stress on safety and patient comfort. All Patient areas have been designed to minimize the risk of infection. AHI was not set up as a hospital for business but rather a dream to fill the gap in the existing healthcare scenario in India.

It offers the full range of cardiology services, from prevention to early disease detection to complex interventions. AHI cardiologists, amongst the best in the country, have been routinely performing all types of cardiac procedures including complex angioplasties, device implantation and closure of congenital heart defects and other high risk cases.

Vision, Mission and Core Values

VISION- “Globally preferred centre of excellence”

MISSION-“To operate as world class heart hospital incorporating the latest technological advancement and ethical practices to provide quality heart care at reasonable cost”

CORE VALUES-

- Highest customer satisfaction
- Highest quality
- Culture of high performance
- Integrity and ethical practice
- Innovation and change



Source- https://en.wikipedia.org/wiki/Asian_Heart_Institute

ANNEXURE-II

Forms & Records

Sr. No	Name of the Form
1	Skin Peels/ Bed sore occurrence –Analysis data sheet
2	Infection surveillance form
3	Infection control risk assessment (ICRA) form
4	Thrombophlebitis occurrence – Analysis data sheet
5	HAI form
6	Needle prick injury report
7	Root cause analysis for Respiratory Tract Infection
8	Root cause analysis for Blood Stream Infection
9	Root cause analysis for Urinary Tract Infection
10	Root cause analysis for Surgical Site Infection
11	Adult Vaccination Record
12	Checklist for Isolation Room
13	Risk Assessment guideline and form.
14	Hepatitis B declaration form
15	NACO Guidelines for PEP

ANNEXURE-III

HAND HYGIENE AUDIT TOOL													
Sr no	Date	Dept:										Done by	
	Hand Hygiene Audit Parameters/ opportunities	1	2	3	4	5	6	7	8	9	10	Aggregate	
1	Hands are free of rings, bangles, watches, long nails, nail paint, full sleeves (sleeves not covering wrist area) etc												
2	Hand hygiene observed before touching a patient												
3	Hand hygiene observed after touching a patient / a contaminated site												
4	Hand hygiene observed after touching a patient's surrounding												
5	Hand wash done before any procedure												
6	Hand wash done at the end of the procedure (immediately after removing gloves)												
7	Hand wash done after body fluid exposure risk												
8	Correct hand hygiene technique used (6 steps)												
9	Adequate amount of soap / hand rub used												
10	Tap turned with use of the elbow												
	Signature of Auditor												

