

Study on knowledge of Infection Control (IC) Practices
Among Health Care Workers (HCWs)

By

Akanksha Rathi

*Dissertation submitted for the partial fulfillment of the
MBA Hospital and Health Management*

Academic year, 2016-2018



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TO WHOMSOEVER MAY CONCERN

This is to certify that **Dr. Akanksha Rathi** student of MBA Hospital and Health Management from The IIHMR University, Jaipur has undergone internship training at Civil General Hospital, Godhra (Gujarat) from **5th February 2018 to 5th May 2018**.

The Candidate has successfully carried out the study designated to his during internship training and his approach to the study has been sincere, scientific and analytical.

The Internship is in fulfillment of the course requirements.

I wish her all success in all her future endeavors.



Col (Dr) Ashok Kaushik

Dean, Academics and Student Affairs

The IIHMR University, Jaipur



Dr. S.D. Gupta

Chairman

The IIHMR University, Jaipur

CERTIFICATE

This is to certify that DR. AKANKSHA RATHI student of IIHMR University, JAIPUR and currently working as Assistant Hospital Administrator (AHA), Civil Hospital, Godhra Dist: Panchmahal has successfully completed her project entitled ***"Assessment and Gap Analysis of Infection Control (IC) Practices among Health Care Workers (HCWs) at Civil Hospital, Godhra"*** under my supervision.

To the best of my knowledge, this project report is the original work of the candidate. I am fully satisfied with the project work and recommend its acceptance.

She comes across as a committed, sincere & diligent person who has a strong drive and zeal for learning.



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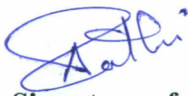
Date: 09.05.2018

Place: Godhra

THE IIMMR UNIVERSITY

CERTIFICATE BY SCHOLAR

**This is to certify that all ethical issues have been considered
while collecting data for my dissertation titled “A STUDY ON
INFECTION CONTROL PRACTICES AMONG
HEALTHCARE WORKERS”**

A handwritten signature in blue ink, appearing to read 'A. Sathya', is written above the text 'Signature of student'.

Signature of student

THE IIHMR UNIVERSITY, JAIPUR

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation Study on knowledge of infection control practices among Healthcare Workers at Civil General Hospital, Godhra (Gujarat) and submitted by Dr. Akanksha Rathi Enrollment No. IIHMR-U/01/2016-18/0374 under the supervision of Dr. S.D. Gupta for award of MBA in Hospital and Health/ of the University carried out during the period from February 5th 2018 to May 5th 2018 embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other institute or other similar institution of higher learning.



Signature

Acknowledgement

Nothing really can be accomplished alone. It is the direction, guidance, involvement and support of more than few that results into realization.

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Regards

Dr.Akanksha Rathi

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List of abbreviations

CCU - Critical care unit

GN - General Ward

HAI – Healthcare Associated Infections

HH - Hand Hygiene

HHC - Hand Hygiene Compliance

HCWs - Health Care Workers

ICCU - Intensive critical care unit

MICU - Medical intensive care unit

OT - Operation theatre

RMO - Resident Medical Officer

SICU - Surgical intensive care unit

WHO - World Health Organisation

DISSERTATION

on

***Study on knowledge of Infection Control (IC) Practices
among Health Care Workers (HCWs)***

1.0 INTRODUCTION

The healthcare workers to prevent the infectious agents from being transferred define infection Control as the approaches. The control measures are based on the actions that needs to be taken with regards to contact, airborne and droplet transmission of infectious agents.

The healthcare workers are mainly exposed to various infectious agents, posing a threat to their health (Twitchell, 2003). Nosocomial infection refers to the infections that are acquired in hospital environment which is acquired during the process of getting medical care and are not manifested when an individual is being admitted to the hospital. It is also called Health Care Associated Infection (HCAI) (Nejad, Allegranzi, Syed, Ellis, & Pittet, 2011). According to the reports by WHO, it is evident that the HCAs are most common in developing countries and the probability of its existence is between 2-20 times compared to the developed nations. It is also important to note that in developing nations, about 5-10 percent of admitted to hospitals acquire the infections (WHO, 2008). Various techniques can be used by healthcare workers to prevent the transmission of the infectious agents. For instance, some of the most efficient and low-cost methods include the thorough washing of hands and also following the correct procedures during invasive procedures. However, it is important to note that such practices are only effective when health care workers are trained and made accountable of such practices (Bouallègue, Naija, Said, Nouria, Jaidane, Dhidah, & Boujaafar, 2013). To adequately prevent the spread, human beings play an important role. For instance, it is established that an increased number of health care workers helps to reduce the number of patients that a single nurse attends to hence reducing the chances of infection transmission (Hugonnet, Chevrolet, & Pittet, 2007). The existence of reservoirs, susceptible hosts and a mode of transmission makes it possible for the infections to easily get transferred. Scholars have established that complying to the health standards during the administration of the healthcare facilities is the most effective and efficient approach that the health care workers can use to prevent transmission (Garner, 1996, Siegel; Rhinehart, Jackson, & Chiarello, 2007).

To establish the most appropriate measure to control the infections, a cross-sectional study done on four hospitals in Hong Kong provided some important insights. The respondents to the study included nurses and physicians who directly offered direct services to patients. 75% of the respondents reported that the most appropriate technique is for the health care workers and patients to comply to hand hygiene practices (Tai, Mok, Ching, Seto, Pittet, 2009)

Research Objective:

- To assess the knowledge for Infection Control Practices among Health Care Workers (HCWs) at General Civil Hospital, Godhra & to identify the major factors causing Health Care Associated Infections (HAIs) to make appropriate recommendations for the corrective action.

Review of literature

HCAIs have resulted to a number of problems including increased period of stay in the hospital, increased death rate, excessive cost of health care and also some form of disabilities among patients. Failure of the health care workers to observe hand hygiene is considered to be the most prevalent propagator of infectious agents and hence the need to emphasize on hand washing as the universal way of preventing the spread of infections.

Despite the simple approach of observing the hand hygiene technique, it is established that a greater percentage of healthcare workers do not follow such simple provisions. With regard to this, only 40% of health care workers comply to the practices. To help in addressing the issue of compliance to washing hands with the aim of preventing the transmission of HCAIs, WHO have tried to define the moments when one has to observe the hands hygiene. WHO describe the following as the five critical moments that healthcare workers need to wash their hand to prevent the spread of infectious agents. The moments include before and after handling a patient, before performing aseptic process, after being exposed to body fluids and after touching a patient. The concept of five moments has been largely applied as a means to remind and also review how the healthcare workers put efforts in preventing the transmission of HCAIs.

It is important to realize that nurses are in the relative position to prevent the spread of the infectious agents. With regard to this, nurses spent a great time with patients as compared to other health care workers and hence the need to be more knowledgeable about the preventive measures against the infectious agents.

During the initial developments of the health care systems, it is established that hand hygiene compliance is among the top approaches that can reduce the impacts arising as a result of HCAIs (Akyol 2007; Ott & French 2009). The fight against HCAIs began when Semmelweis (1847), discovered that puerperal fever was most common within the maternity wards where operations were done by medical students and physicians. Semmelweis argues that most medical students and physicians most of the times do not observe the hand hygiene practices when helping women in the maternity wards.

It is argued that the compliance rate of hand hygiene is still low despite the fact that most health care workers being aware of the problems associated with health care associated infections (Takahashi & Turale 2010; Trampuz & Widmer 2004). This is supported by the evidence that most of the developing countries have a hand hygiene compliance of less than 50% (Mani et al. 2010; Maxfield & Dull 2011; Ott & French 2009).

WHO 5 Moments of Hand Hygiene

1: Before touching a patient

This moment is based on the two-zone concept. Two-zone concept refers to the situation whereby the health care workers move from one zone to another in performing their duties. With regard to this, the health care workers are required to wash hand before handling the patient. For instance, before greeting the patient after touching the door handle of the ward door.

2: Before clean/aseptic procedure

Being the patient zone, the health care workers are also required to practice hand hygiene. For instance, after handling patient's wound, there is a need to wash hand before beginning aseptic procedures such as performing some surgical operations. This is important has it prevent the transmission of the infectious agents between the clean and zones that maybe contaminated.

3: After body fluid exposure risk

During the performance of their duties, the health care workers are likely to get exposed to body fluids from patients. For instance, in handling the wound cleaning, a health care worker is likely to get exposed to some body fluids. It is important to practice hand hygiene before touching any other place. This is important because it helps to prevent the transmission of infectious agents between the patient zone and clean zone.

4: After touching a patient

Having attended to patient, health care workers are at risk of getting their hands being colonized by the infectious agents. It is important that hands hygiene be practiced before touching other equipment within the health zone. For instance, a patient might be carrying some infectious organisms and hence the failure to wash hand s is likely to cause the organisms to be transferred to other areas of health care zone.

5: After touching patient surroundings

Hand hygiene is required after being in contact with the objects within the patient region even if there is no direct contact with the patient. For instance, a health care worker may touch a bedding of the patient. This poses a threat of transferring the micro-organisms to other areas and hence the need to practice hand hygiene after touching the patient surroundings.

METHODOLOGY

Aim

To study infection control practices among the Health Care Workers.

Objectives

- To establish the knowledge for Infection Control Practices among Health Care Workers (HCWs) at General Civil Hospital, Godhra & to identify the major factors causing Health Care Associated Infections (HAIs) to make appropriate recommendations for the corrective action.

Research Methodology

Study type: Both primary and secondary research were adopted in this study

Area of Study: Civil General Hospital, Godhra

Data Collection Methods:

Primary Data-

- Quantitative data to be collected from 350 HCWs
- Interviews discussions with the concern population of the study
- Direct observation
- Conducting surveys

Secondary Data-

- SOPS, Policies and Different Manuals such as Quality Manual, Technical Guidelines Manual etc. of the Civil General Hospital, Godhra (Gujarat).

Research Questions

- What are levels of HCWs knowledge about infection control at Civil General Hospital, Godhra?
- What are levels of nurses' practices of infection control at Civil General Hospital, Godhra?
- Are there relationships between infection control practices and age, gender, qualification, years of experience, working department and training on infection control practices?

Source of Data: Health Care Workers

Sample size: 350 Health Care Workers

Sampling Technique: Simple random sampling. 350 healthcare workers were randomly selected.

Results and Data Analysis

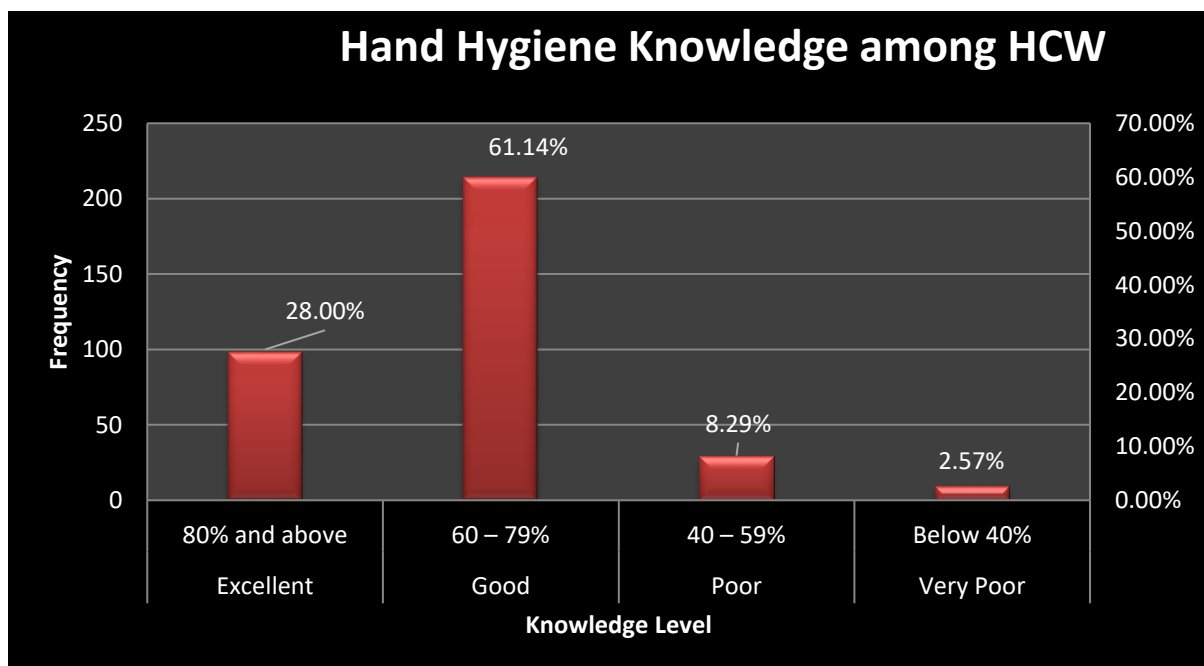
Hand Hygiene Knowledge among HCW

From the analysis of the distributed questionnaires, the study established the knowledge level among the health care workers. The workers were classified into the following groups basing on their knowledge:

- Excellent knowledge: 80% and above
- Good knowledge: 60 – 79 %
- Poor knowledge: 40 – 59%
- Very poor knowledge: Below 40%

This analysis is summarized in the **Table 1** below:

Knowledge Level	Category	Frequency	Percentage (%)
Excellent	80% and above	98	28.00%
Good	60 – 79%	214	61.14%
Poor	40 – 59%	29	8.29%
Very Poor	Below 40%	9	2.57%
		350	100.00%



The bar graph above indicates that from the sample size of 350 workers, 28% (98 healthcare workers) have an excellent knowledge on hand hygiene, 61.14 % (214 workers) have good knowledge, 8.29% (29 workers) have poor knowledge while 2.57% (9 workers) have very poor knowledge about the hand hygiene.

Observations of WHO 5 Moments of Hand Hygiene Practices among Healthcare Workers

The study involved observing the practices by the healthcare workers before/after the moment. The observation was recorded as “correct moment”.

The Hand Hygiene Compliance (HHC) was calculated using the following formula:

$$\text{HHC} = (\text{Total Number of Observed Moment} / \text{Total Number of Observed moments}) * 100$$

Table 2 below displays how the Health Care Workers at Civil General Hospital, Godhra observe WHO 5 moments.

	Before patient contact	Before Aseptic procedure	After Fluid Exposure	After Patient Surroundings	After Patient Contact	Overall
Correct	275	61	132	153	256	877
Observed	300	123	145	250	300	1118
Compliance rate	91.67%	49.59%	91.03%	61.00%	85.23%	78.45%

Hand Hygiene Compliance = Correct Observed/ Total Observed * 100

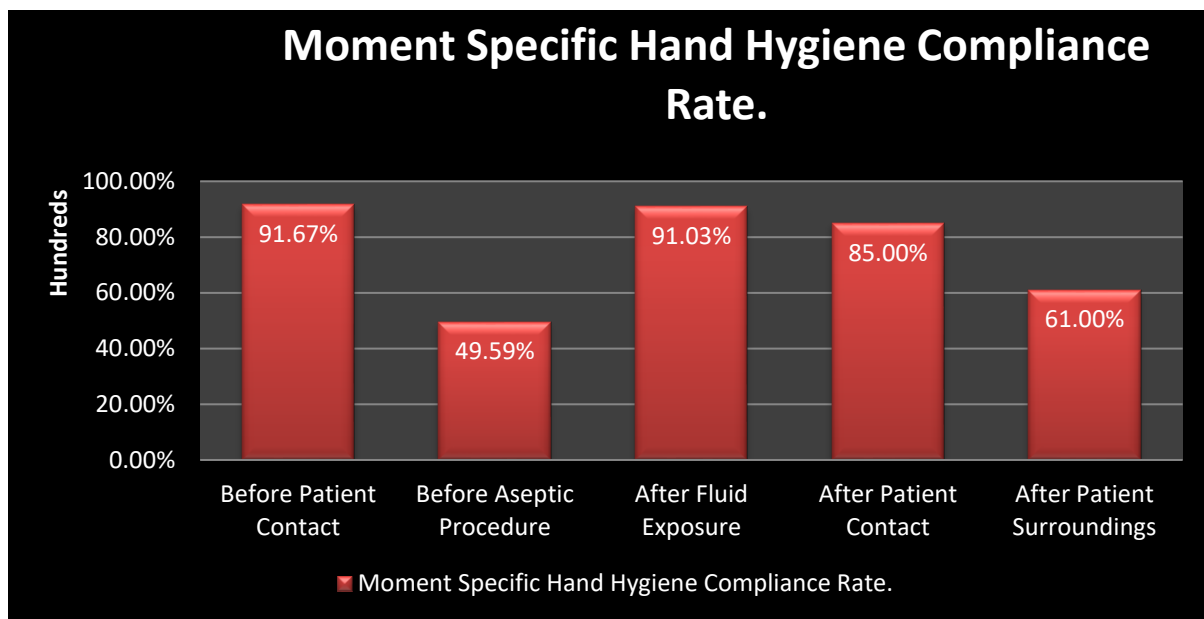
$$= 877/1118 * 100$$

$$= 78.45 \%$$

The total number of observed moments (considering all five moments of hand hygiene) was 1118, of which there were 877 correct moments, giving an overall Hand hygiene compliance rate of 78.45%.

The total number of observed moments and the total number of correct moments recorded separately for each WHO 5 Moments of hand hygiene. For each moment, percentage of correct hand hygiene moments was also calculated separately. It indicates the moment specific hand hygiene compliance rate.

Moment Specific Hand Hygiene Compliance Rate

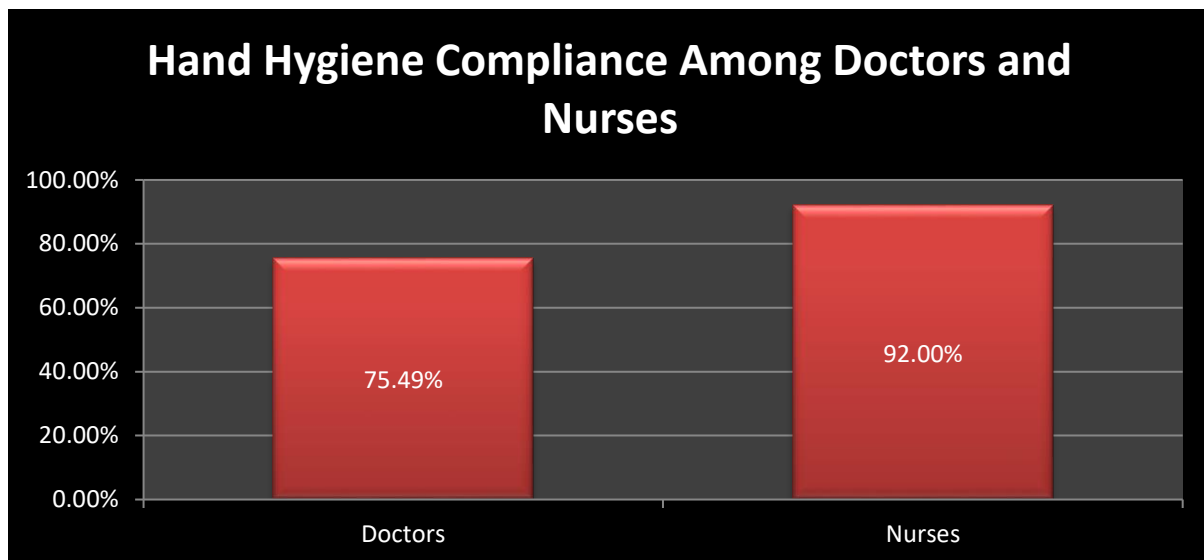


The bar graph above shows Moment Specific Hand Hygiene Compliance Rates. It shows that hand hygiene compliance was found to be highest before patient contact at – 91.67%, followed by after fluid exposure at 91.03% followed by after patient contact at 85.00% with after patient surroundings at 61.00% and before Aseptic procedure at 49.59% with the lowest hand hygiene compliance rates.

Hand Hygiene Compliance among Doctors and Nurses

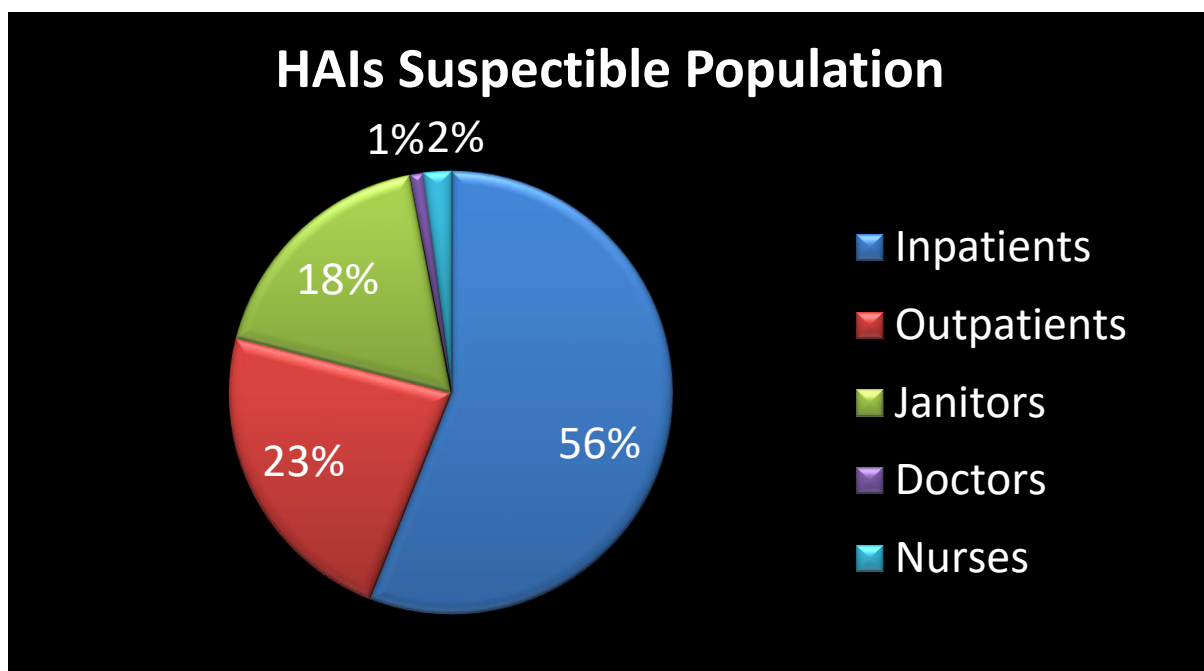
The study also involved calculation of compliance rates among the nurses and doctors. The table below indicates the compliance rates among the nurses and doctors.

Profession	Total number of Observed Moments	Total number of Correct Moments	Hand Hygiene Compliance Rate
Doctors	102	77	75.49%
Nurses	150	138	92.00%



The study established that the nurses has a better compliance rate compared to doctors. The compliance rate for the observed nurses was 92.00% while that of doctors was found to be 75.49% indicating that the nurses have a better hand hygiene practices.

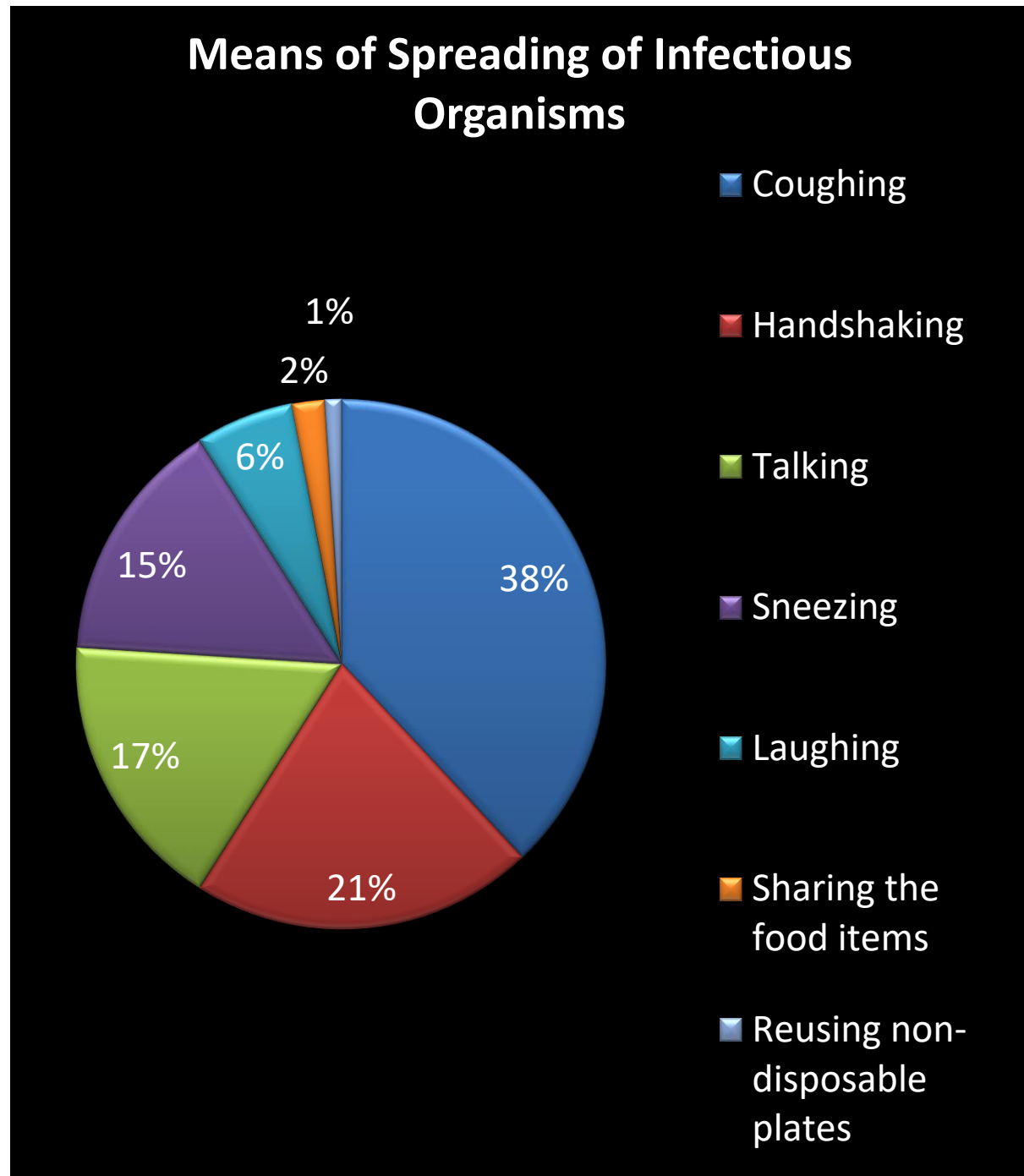
HCAIs Susceptible Population



From the study, inpatients are the more susceptible to HAIs which is indicated by 56% of the research response. Outpatients are second likely to be infected with HAIs, 23%. The respondents also revealed that the frequency of janitors to be affected is 18% while doctors

and nurses are the least likely to be affected as represented by 1% and 2% respectively by the respondents.

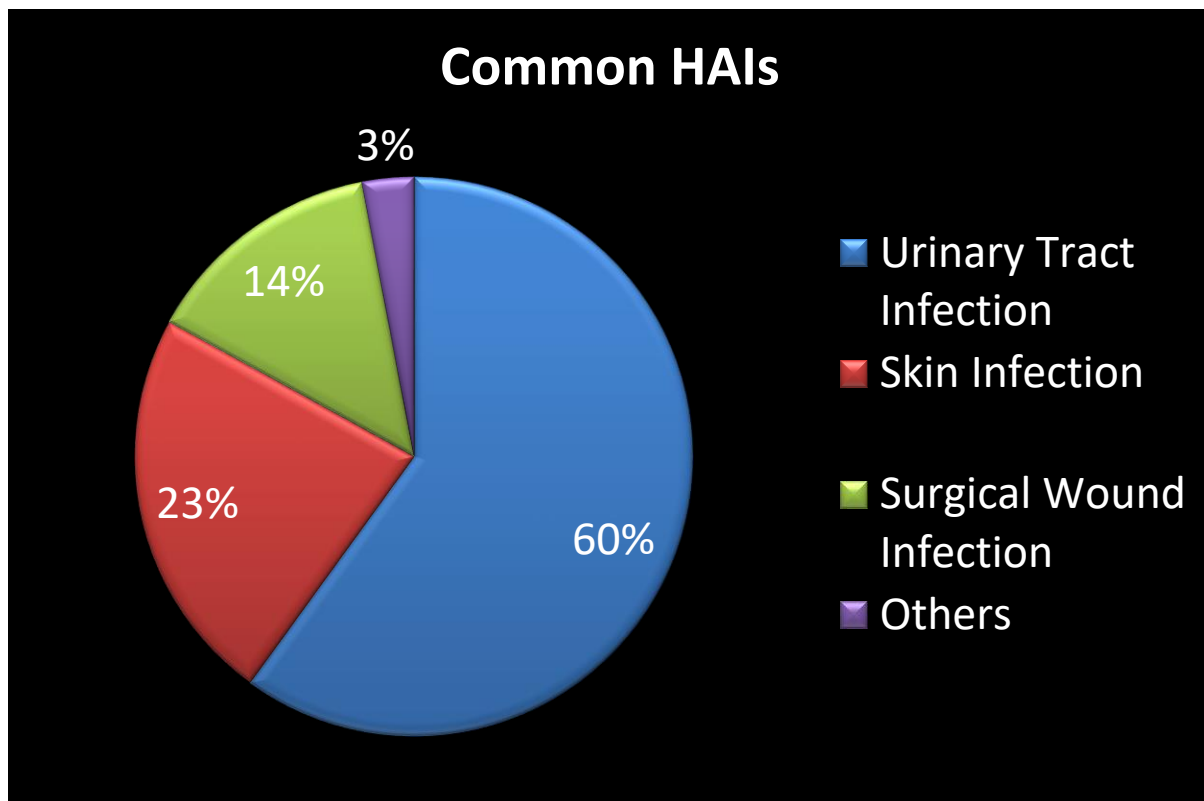
Spread of Infectious Organisms



From the study, out of the 350 respondents, 38% indicated that the most prevalent means of HCAs spreading is through coughing, 21% indicated handshaking is the second means by which the organisms spread. This leads to a translation that some percentage of healthcare

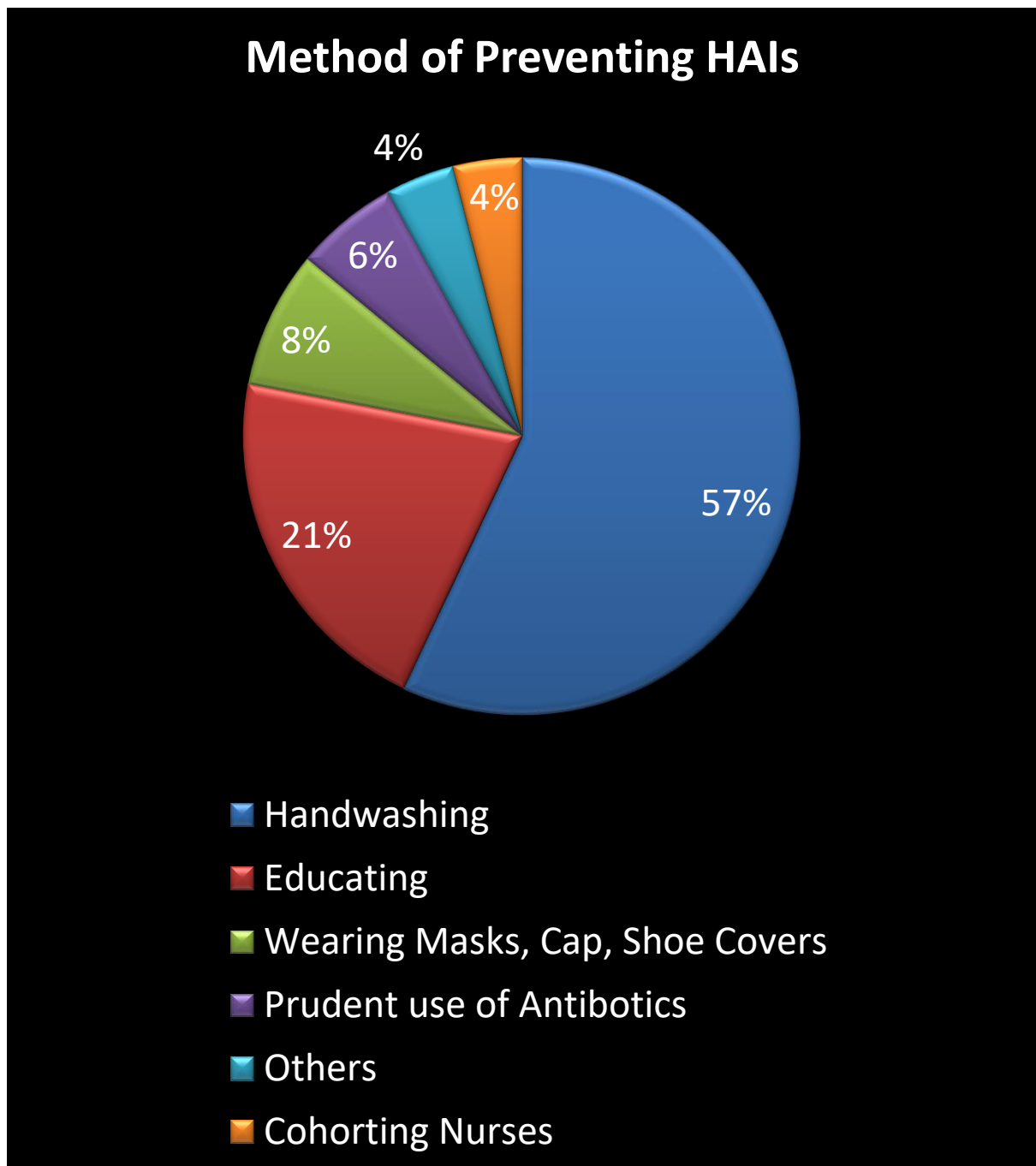
workers do not comply to hand hygiene practices. Talking with an infected person and also when sneeze from an infected patient spreads HCAs indicated by response of 17% and 15% respectively. Other means is through laughing, sharing the food items and reusing non-disposable plates.

Common HCAs at Civil General Hospital Godhra, Gujarat



The most common HAIs Urinary Tract Infection (UTI) which was reported by 60% of the respondents. 23% of the respondents indicated skin infection is also prevalent in the hospital environment. 14% of the respondents indicated surgical wound infection is also prevalent as a result of some healthcare workers not maintaining mainly hands hygiene in performing their duties. 3% of respondents indicated that there is existence of other infections such as blood stream infection.

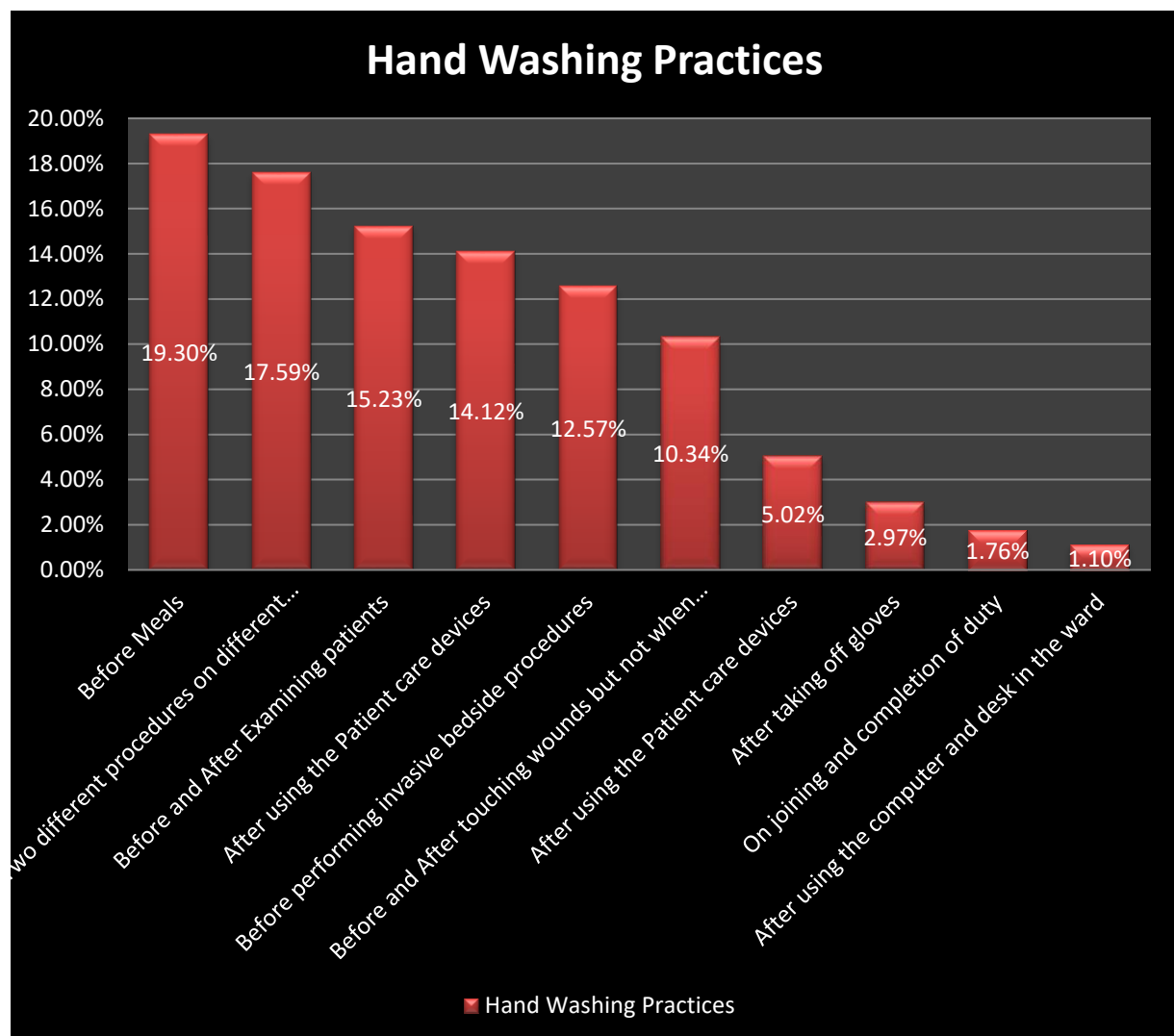
Methods of Preventing HAIs



From the study, 57.14% of the respondents agreed to the fact that hand washing is the most effective way of preventing HAIs in the hospital environment. 20.86% indicated educating healthcare workers in the second best approach that needs to be implemented to prevent the spread of infections. Additionally, 8.57% agreed that putting on protective garments is also a preventive measure mainly for the infections that are air-borne. Cohorting nurses is the least measure that can be implemented to prevent the infections. On the other hand, 6% of

respondents indicated prudent use of vaccines may also help to prevent the infections. 4% of indicated regular vaccination of healthcare workers may also be used as an alternative approach.

Hand Washing Practices



The bar graph above shows a summary of the hand washing practices and compliance rates at Civil General Hospital Godhra Gujarat. It is evident that the healthcare workers always clean hands before handling the meals. However, it is evident that in other places, the hand hygiene practices are not fully complied with. For instance, it established that only 1.10% of healthcare workers wash hands after using computers.

Discussion

Discussion

The study found a larger percentage of healthcare workers are knowledgeable about the health care associated infections. From the study, 28% of the people who responded to the survey had excellent knowledge about health care associated infections including urinary tract infection and skin infections. It was also established that a greater percentage of healthcare workers had good knowledge. This was represented by 61.14% of the 350 respondents. However, some healthcare workers had poor and very poor knowledge concerning the existence of HCAs. These were represented by 8.29% and 2.57% respectively. Poor knowledge means such individuals do not understand when and how to wash hands.

Basing on the WHO 5 moments specific hand hygiene practices a varying percentage were observed. The hand hygiene compliance rates were highly observed before making contact with patients which had a rate of 91.67 followed by after fluid exposure at 91.03% followed by after patient contact at 85.23% with after patient surroundings at 61.00% and before Aseptic procedure at 49.59% with the lowest hand hygiene compliance rates. The higher compliance rate of before and after patient contact is attributed to the fact that a great number of healthcare workers are knowledgeable of health care associated infections. The lower rates in relation to before aseptic procedures could be attributed to the assurance of healthcare workers get from washing hands after “after patient surroundings”.

The analysis also established that nurses are better at observing controls that can help prevent HCAs as compared to doctors. The analysis indicates 92% of nurses practice hand hygiene practices at various moments as discussed in WHO 5 moments. On the other hand, only 75.49% of doctors were observed to be practicing hand hygiene practices.

The main challenge in conducting this study was in data collection. This is because the healthcare workers could have realized being observed and hence change the normal practices at the hospital. The main challenge in conducting this study was in data collection. This is because the healthcare workers could have realized being observed and hence change the normal practices at the hospital which is well known as Hawthorne Effect defined as the alteration of behaviour by the subjects of a study due to their awareness of being observed.

Also during some of the audit sessions, there was a shortage in the number of staff members due to less number of patients in the hospital, thus limiting the amount of data collected

Additionally, the collection of data to 350 respondents was limited by the fact that only fewer staff were available because of reduced number of patients in the hospital.

Conclusion

Conclusion

The analysis of the data collected led to a number of conclusions concerning health care associated infections at Civil General Hospital Godhra Gujarat. Firstly, most of the healthcare workers are knowledgeable about the practices to prevent HCAs. It is also concluded that the overall compliance rate of 78.45% is a clear indication that the healthcare workers are at a good bar in terms of complying to the practices that can help control health care related infections. Finally, the analysis brings out the conclusion that total observation of hand hygiene practices is the best approach that can be implemented by hospitals to reduce the cases of healthcare associated infections.

Having realized the need to prevent HCAs, it is evident that healthcare workers need to develop a habit of practicing what can help to lead to prevention. This can be well achieved by complying to hospital policies such as hand washing policies. With regard to this, it is important for all the healthcare workers to observe hands hygiene at the WHO 5 moments that were previously analyzed.

The study indicates a greater percentage of healthcare workers are knowledgeable about the healthcare associated infections. Through the study, it was also established that a great percentage of health workers comply to the hands hygiene practices and there is a need to create awareness in order to completely prevent the infections. With regards to compliance, the study indicated the nurses have a higher compliance rate as compared to those of doctors.

The study established that there are a number of health care associated infections, which include urinary tract infections, surgical wound infections, skin infections and others such as blood stream infections. The infections are mainly because of healthcare workers failing to comply with the hands hygiene practices, which involve cleaning of hand at various moments.

From the study, it was established from the health workers that some approaches can be implemented to prevent the spread of health care associated infections. Some of the techniques include washing hands, educating the healthcare workers on the importance and ways to avoid being infected. Wearing caps, masks and shoe covers and prudent use of antibiotics. Other techniques may include cohorting nursing and regular vaccination of healthcare workers.

Recommendations

Recommendations

The following are some of the recommendations as a result of the study conducted on health care associated infections at Civil General Hospital Godhra Gujarat.

- Clean, non-sterile gloves are safe for touching blood, other body fluids, contaminated items and any other potentially infectious materials
- Change gloves between tasks and procedures in the same patient especially when moving from a contaminated body area to a clean body area
- Wash hands with soap and water when they are soiled or visibly dirty with blood or other body fluids. Wet your hands, apply soap and then scrub them vigorously for at least 15 s. Cover all surfaces of the hands and fingers, wash with water and then dry thoroughly using a disposable towel
- Use an alcohol-based hand rub e.g. 0.5% chlorhexidine with 70% w/v ethanol, if hands are not visibly dirty. A combination of chlorhexidine and alcohol is ideal as they cover Gram-positive and Gram-negative organisms, viruses, mycobacteria and fungi. Chlorhexidine also has residual activity.
- Wear a gown to prevent soiling of clothing and skin during procedures that are likely to generate splashes of blood, body fluids, secretions or excretions (IB)
- The sterile gown is required only for aseptic procedures and for the rest, a clean, non-sterile gown is sufficient

Key Learning points

The internship period was of great value in enhancing my career. The internship was necessary because it provided an opportunity to learn and gain experience of how different functions of the hospital operate. The internship also provided an opportunity to learn of the different hospital policies as I was working as Assistant Hospital Administrator (AHA), at Civil Hospital, Godhra.

Due to the support and guidelines of my mentor and hospital staff, I could acquire skills and exposure. Few of the learning's were as follows:

Hospital scenario:

- Hospital policies, standards and protocols
- The commonly used terms in the hospital environment.
- Detailed working of hospital
- Functioning of patient care system
- Department working knowledge
- Patient safety, rights and responsibility

Professional skills

- How to collect and analyze data
- To maintain and update documents

Soft skills

- To interact professionally
- Making presentations before a panel
- Time management and quick decision making
- Committing and delivering quality results to assigned tasks

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Annexure 1

Questionnaire for Health Care Workers (HCWs) at Civil Hospital, Godhra Dist: Panchmahal (Guj.)

Healthcare-associated infections (HAIs) are infections acquired during the course of receiving treatment for other conditions within a healthcare facility.

Note: SC: single-choice; MC: multiple-choice; C: Content based

1. Are you aware of HCAs in your hospital? YES ☒ NO ☐

2. Which of the following HCAs are commonly seen in your hospital? **MC**

- ☐ A. Urinary tract infections (UTI)
 - ☐ B. Surgical wound infections
 - ☐ C. Respiratory tract infections (RTI)
 - ☐ D. Blood stream infections (i.e., bacteremia and/or septicemia)
 - ☐ E. Gastrointestinal tract infections (GITI)
 - ☐ F. Skin infections
 - ☐ G. Others; please specify:

3. Which infectious agents are commonly implicated in HCAs? **MC**

- ☐ A. Methicillin-resistant *Staphylococcus aureus* (MRSA)
 - ☐ B. **Vancomycin-resistant enterococcus (VRE)**
 - ☐ C. *Pseudomonas aeruginosa*
 - ☐ D. *Klebsiella pneumoniae*
 - ☐ E. *Mycoplasma pneumoniae*
 - ☐ F. *Streptococcus pneumoniae*
 - ☐ G. *Mycobacterium tuberculosis*
 - ☐ H. *Escherichia coli*
 - ☐ I. *Clostridium difficile*
 - ☐ J. *Bordetella pertussis*
 - ☐ K. *Acinetobacter baumannii*
 - ☐ L. *Stenotrophomonas maltophilia*
 - ☐ M. *Haemophilus influenzae*
 - ☐ N. *Candida albicans*
 - ☐ O. Rotavirus
 - ☐ P. Norovirus (Norwalk virus)
 - ☐ Q. Influenza virus
 - ☐ R. Hepatitis A virus (HAV)
 - ☐ S. Respiratory syncytial virus (RSV)
 - ☐ T. Not identified

4. Can you name at least 5 pathogens most commonly isolated in your hospital? C

5. Which population is the most susceptible to HCAs? SC

☐

A. Inpatients

☐

B. Outpatients

☐

C. Doctors (including medical students and interns)

☐

D. Nurses

☐

E. Janitors

☐

F. Visitors/care givers

☐

G. Cleaner

☐

H. Animal (rat)

6. Which is the most important source/reservoir of HCAs? **SC**

- ☐ A. Inpatients
- ☐ B. Outpatients
- ☐ C. Doctors (including medical students and interns)
- ☐ D. Nurses
- ☐ E. Care givers or Attendants
- ☐ F. Visitors
- ☐ G. Cleaners
- ☐ H. Animals such as rats

7. Which of the following behavior(s) can spread infectious organisms? **MC**

- ☐ A. Coughing
- ☐ B. Spitting
- ☐ C. Talking
- ☐ D. Laughing
- ☐ E. Sneezing
- ☐ F. Handshaking
- ☐ G. Hugging
- ☐ H. Kissing
- ☐ I. Sharing a drinking straw
- ☐ J. Reusing non-disposable chopsticks

8. To prevent HCAs, you should report to your health department when you have contracted: **MC**

- ☐ A. Hepatitis B (HBsAg +)
- ☐ B. Hepatitis A
- ☐ C. HIV
- ☐ D. Herpes zoster (shingles)
- ☐ E. Influenza
- ☐ F. Food poisoning
- ☐ G. Acute viral (hemorrhagic) conjunctivitis
- ☐ H. Malaria

9. When a patient with pulmonary tuberculosis can be removed from the isolation room? **SC**

- ☐ A. After patient's signs and symptoms have disappeared
- ☐ B. When chest X-rays become negative
- ☐ C. After 3 consecutive negative sputum smear
- ☐ D. After 3 consecutive negative sputum culture

10. Which is the single most effective method to prevent HCAs? **SC**

- ☐ A. Hand washing properly
- ☐ B. Wearing caps, masks, and shoe covers
- ☐ C. Regular vaccination of health care workers
- ☐ D. Isolation (cohorting) of infected/colonized patients
- ☐ E. Cohorting staff (assignment of staff to a cohort of patients)
- ☐ F. Prudent use of antibiotics
- ☐ G. Educating healthcare workers, patients, and families
- ☐ H. Visitor management

11. Which is the preferred hand washing method to prevent transmission of *Clostridium difficile*-associated infections? SC

- ☐ A. Alcohol hand rub
- ☐ B. Water and soap
- ☐ C. Iodine solution

12. Which of the following(s) can effectively prevent spreading or protect you from influenza (flu) during the flu season? **MC**

- ☐ A. Frequent hand washing and avoidance of touching mouth and nose
- ☐ B. Wearing a mask when you have a flu
- ☐ C. Covering mouth and nose when sneezing or coughing
- ☐ D. Staying home and sleeping well
- ☐ E. Receiving Tamiflu (Oseltamivir) or Relenza (Zanamivir) before catching a flu
- ☐ F. Receiving Tamiflu (Oseltamivir) or Relenza (Zanamivir) within 36 h of the onset of flu symptoms

13. Which of the followings are the recognized sources of HCAs? **MC**

- ☐ A. White coat
- ☐ B. Nurse uniform
- ☐ C. Stethoscope
- ☐ D. Thermometer
- ☐ E. Wrist watch (used for patient care)
- ☐ F. Blood pressure cuff (sphygmomanometer)
- ☐ G. Mattresses and pillows
- ☐ H. Bed side curtains
- ☐ I. Chairs/stools/cabinets
- ☐ J. Air conditioners

14. With regard to HCAs, visitors may have negative impacts on patients(and community)by: **SC**

- ☐ A. Disturbing patient's rest
- ☐ B. Transmitting infectious agents between patients
- ☐ C. Serving as a carrier of multidrug-resistant pathogens from/to community
- ☐ D. Disturbing effective infection control measures
- ☐ E. Smoking within the patients' room

15. With regard to visit or management in hospital settings, which of the following is/are correct? **MC**

- ☐ A. Visitors should be allowed to stay with patients at any time except during clinical rounds
- ☐ B. Children visitors should not be allowed to visit patients at all
- ☐ C. Children visitors should be allowed to visit only their own siblings
- ☐ D. Visitor screening (for potential infectious diseases) should be observed all time
- ☐ E. Visitor screening should be observed only during community outbreaks
- ☐ F. Symptomatic visitors should be excluded unless they have received appropriate medical screening, diagnosis, or treatment

16. Which of the following is/are closely associated with the emergence of multi drug resistant organisms (MDROs)? **MC**

- ☐ A. Poor infection control guidelines
- ☐ B. Poor adherence to recommended infection control practices of healthcare workers
- ☐ C. Poor prescribing behavior of doctors
- ☐ D. Poor patient compliance
- ☐ E. Antibiotic abuse or overuse
- ☐ F. Antibiotic cycling practice

17. Do you consider all patient potentially contagious? ☐ YES ☐ NO

18. Which of the followings from patients do you assume to be infectious? **MC**

- ☐ A. Blood
- ☐ B. Nasal discharge
- ☐ C. Saliva
- ☐ D. Vomitus
- ☐ E. Feces
- ☐ F. Urine
- ☐ G. Sweat
- ☐ H. Vaginal secretion
- ☐ I. Non-intact skin (cut, abrasion, eczema)
- ☐ J. Mucous membranes (oral cavity, eyes)

19. Do you consider all unsterile needles and sharps are contaminated? YES NO
20. If YES, which personnel or environmental sources of infection should be included for microbial cultural analysis? **MC**
- ☐ A. Air
 - ☐ B. Water
 - ☐ C. Disinfectants and antiseptics
 - ☐ D. Inanimate healthcare objects
 - ☐ E. Environmental surfaces
 - ☐ F. Hands of healthcare workers
 - ☐ G. Anterior nares of healthcare workers
21. The proper minimum spacing between beds in multi-patient rooms should be: **MC**
- ☐ A. 0.6 meter (or 2 feet)
 - ☐ B. 1 meter (or 3 feet)
 - ☐ C. 1.5 meters (or 5 feet)
 - ☐ D. 0.6 meter with a curtain between beds (for infected/colonized patients)
 - ☐ E. 1 meter with a curtain between beds (for infected/colonized patients)
 - ☐ F. 1.5 meters with a curtain between beds (for infected/colonized patients)
22. Do you know how to wash your hands in the six-step hand washing technique? YES NO
23. With regard to white coats, check the correct answers: **SC**
- ☐ A. White coat can prevent hospital-associated infections
 - ☐ B. Long-sleeve white coats are more preventative than short-sleeve white coats
 - ☐ C. A disposable gown should be donned over the white coat when performing invasive bedside procedures
 - ☐ D. It is not required to take off the white coat when going to the canteen inside the hospital
24. How do you usually wash your hands while ON DUTY? **MC**
- ☐ A. Wash with running water
 - ☐ B. Wash with running water and bar soap
 - ☐ C. Wash with running water and hand-washing liquid
 - ☐ D. Wash with running water and skin disinfectant
 - ☐ E. Wash with alcohol hand rub
25. When do you wash your hands? **MC**
- ☐ A. Before meals
 - ☐ B. Before performing invasive bedside procedures
 - ☐ C. Before and after examining patients
 - ☐ D. Before and after touching wounds, but not when gloved
 - ☐ E. Between two different procedures on different patients
 - ☐ F. Between two different procedures on the same patient
 - ☐ G. After using the patient-care devices
 - ☐ H. After using the computer and desk in the ward
 - ☐ I. On joining and completion of duty
 - ☐ J. After taking off gloves

26. When do you wear medical utility (non-sterile) gloves? **SC**

- ☐ A. Using the computer, desk, or patient-care equipment in the ward
- ☐ B. Prescribing drugs
- ☐ C. Performing physical examination on patients
- ☐ D. Making clinical rounds
- ☐ E. None of above

27. What type of personal protection equipment (PPE) would **YOU** wear? *Check more than one if applicable.

	<u>Gown</u>	<u>Mask</u>	<u>Goggles</u>	<u>Face shield</u>	<u>Gloves</u>	<u>None</u>
A. Transporting coughing patients in/out of ward	☐	☐	☐	☐	☐	☐
B. Drawing blood from a patient	☐	☐	☐	☐	☐	☐
C. Irrigating a septic wound	☐	☐	☐	☐	☐	☐
D. Nasogastric suctioning	☐	☐	☐	☐	☐	☐
E. Performing lumbar puncture	☐	☐	☐	☐	☐	☐
F. Visiting the neonatal intensive care unit(NICU)	☐	☐	☐	☐	☐	☐
G. Performing physical examination	☐	☐	☐	☐	☐	☐
H. Attending patients with fecal incontinence	☐	☐	☐	☐	☐	☐
I. Delivering a baby of an HIV-positive woman	☐	☐	☐	☐	☐	☐

28. How often do you clean your stethoscope with antiseptic (e.g., 70% alcohol)? **SC**

- ☐ A. After examining each patient
- ☐ B. Daily
- ☐ C. Weekly
- ☐ D. Monthly
- ☐ E. Never

29. How often do you wash your white coat or nurse uniform? **SC**

- ☐ A. Daily
- ☐ B. 3 times a week
- ☐ C. Twice a week
- ☐ D. Weekly
- ☐ E. Monthly
- ☐ F. Never

30. Have you ever been splashed by patient's blood, vomit, or other bodily fluids? ☐ YES ☐ NO

31. Have you ever sustained a used needlestick injury? ☐ YES ☐ NO

32. What action would you take immediately after exposure to HBV- or HIV-contaminated bodily fluid? **MC**

<u>wash liberally with</u> soap scrubbing	followed by water antiseptics
--	----------------------------------

- | | | | | |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| A. Healthy intact skin | ☐ | ☐ | ☐ | ☐ |
| B. Wound or non-intact skin (e.g., cut, abrasion, eczema) | ☐ | ☐ | ☐ | ☐ |
| C. Mucous membrane s(e.g., eyes) | ☐ | ☐ | ☐ | ☐ |

33. What kind of patients would you mask during transfer/transport out of room for investigations? **MC**

- ☐ A. Patients suffering from influenza
- ☐ B. Coughing patients with suspected pulmonary tuberculosis
- ☐ C. Patients receiving radiation therapy or colon cancer
- ☐ D. All patients regardless of their illness

34. Where should infectious waste from patients be disposed of? **SC**

- ☐ A. Yellow garbage bag
- ☐ B. Black garbage bag
- ☐ C. Red garbage bag
- ☐ D. No idea

36. Have you ever treated cases of multidrug resistant (MDRO) infection? **SC** YES ☐ NO ☐

37. Your prescribing practice is based on: **SC**

- ☐ A. your own experience
- ☐ B. The practice of your seniors
- ☐ C. The hospital/national guidelines
- ☐ D. the information provided with the drug box
- ☐ E. Chinese pharmacopoeia

38. What is your selection criterion (the order of importance) when prescribing antibiotics? **C**

- A. Anti microbial spectrum
- B. Cost
- C. Brand
- D. Generation

Order of importance: 1) _2)_____3)_____4)_____

39. When do you prescribe/administer antibiotics to patients with an apparent infection? **SC**

- ☐ A. As soon as patients are admitted to the ward
- ☐ B. After receiving microbiological culture and sensitivity (C &S) results
- ☐ C. After taking clinical samples for microbiological examination
- ☐ D. Before taking clinical samples for microbiological examination
- ☐ E. Before taking clinical samples for microbiological examination but make changes after the C & S results
- ☐ F. After taking clinical samples for microbiological examination and make changes after the C & S results

40. Your decision to switch antibiotics in the course of anti-infection therapy is based on: **MC**

- ☐ A. Unabated fever
- ☐ B. Clinical response

c. Culture and sensitivity (C&S)report

☐ d. Patient's affordability

☐ e. Other reasons; please specify:

41. Do you think your hospital has good infection control management and practice? ☐ YES ☐ NO

42. If NO, what and how should be improved? Please feel free to write your suggestion. C

Full Name:

Designation:

Signature:

Date:

***** Thank you for completing this Questionnaire *****

**** Please turn it at AHA Office, Civil Hospital, Godhra as directed**