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Importance Of Hand Hygiene In Microbiology Laboratory

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ABSTRACT:-

Lab. workers are at risk of infection because of their daily exposure to micro-organisms. Consequently, many cases of lab.-associated infections have been reported. OSHA, CDC and many other groups provide standards and guidelines for lab. safety. Hand hygiene is an important element of all these standards. While health-care workers (HCW) in patient care should disinfect their hands mainly to prevent transmission of pathogens to patients, lab. personnel should do so to protect themselves.

OBJECTIVES:

i. To assess the risk of health care associated infection due to practice of poor hand hygiene while handling microbes.
ii. To develop the awareness of hand Hygiene.
iii. To teach technique of good hand hygiene and their indications.

SIGNIFICANCE:

- To protect lab. personnel with hand hygiene or its effect of preventing Infections among this group of HCWs.
- To prevent the false reading while handling culture medias.

METHODOLOGY:

By assessing the risk of health care associated infection due to practice of poor hand hygiene in lab. or in any areas of Hospital.

FINDINGS:

Around 95% of HCWs don't know about good hygiene practice. After a sch. teaching, now they are performing good hand hygiene practices and prevent biasness in culture and also prevents themselves from HAI.

RECOMMENDATIONS:

A similar research project can be conducted by using other strategies by developing informative booklets.

INTRODUCTION

"The majority of the knowledge we have about the world around us comes through our eyes. Even though most people recognize how precious sight is, many are not taking necessary steps to steps to have optimal vision & to protect their eye health"

- **Dr. Samuel D. Pierce, O.D.**

Hand hygiene is a method of hand cleansing that sign. minimises possible pathogens (harmful germs) on the hands. Hand hygiene is regarded as a primary measure for lowering the risk of infection transmission among patients and health care staff. Hand hygiene treatments include the use of alcohol-based hand rubs (containing 60%-95% alcohol) and soap and water hand washing. Before putting on sterile surgeon's gloves for surgical procedures, perform a surgical hand scrub. Use alcohol-based hand rub or water and plain or antimicrobial soap specific to health care environments for routine dental examinations and nonsurgical procedures. In most clinical contexts, an alcohol-based hand rub is favoured over soap and water unless hands are obviously filthy (e.g., dirt, blood, body fluids) since it:

- Is more effective than soap at killing potentially deadly germs on hands.
- Requires less time.
- Is more accessible than handwashing sinks.
- Produces reduced bacterial counts on hands.
- Improves skin condition with less irritation and dryness than soap and water.

Lab. workers are at risk of infection because of their daily exposure to micro-organisms. Consequently, many cases of lab.-associated infections have been reported. OSHA, CDC and many other groups provide standards and guidelines for lab. safety. Hand hygiene is an important element of all these standards. While health-care workers (HCW) in patient care should disinfect their hands mainly to prevent transmission of pathogens to patients, lab. personnel should do so to protect themselves. Over the last decennia the

promotion of hand hygiene among HCWs was a major component of infection control programs and research – primarily Directed to patient care. However, there is no study on the compliance of lab. personnel with hand hygiene or its effect of preventing Infections among this group of HCWs. The aim of our study is to measure the compliance of lab. personnel with different components of hand hygiene.

DEFINITION

Hand hygiene is an action of performing hand hygiene for the purpose of physically or mechanically removing dirt, organic material, and/or microorganisms

-According to WHO Guidelines

Regular handwashing is one of the best ways to remove germs, avoid getting sick, and prevent the spread of germs to others. Whether you are at home, at work, traveling, or out in the community, find out how handwashing with soap and water can protect you and your family.

-According to CDC

Normal flora of hands:

There are two types of microbes colonizing hands: the resident flora, which consists of microorganisms residing under the superficial cells of the stratum corneum and the transient flora, which colonizes the superficial layers of the skin, and is more amenable to removal by routine hand hygiene. Transient microorganisms survive, but do not usually multiply on the skin. They are often acquired by health care workers (HCWs) during direct contact with patients or their nearby contaminated environmental surfaces and are the organisms most frequently associated with HCAIs.

NEED OF HAND HYGIENE IN A LAB.

"**Life cannot be saved for**

tomorrow It always happens in

the present."

-Rubem Alves

Hand washing is an essential component of lab. safety. In fact, this few minutes activity is considered

one of the most important procedures used to prevent microbiological agents, radioactive materials, and chemicals from contaminating you and the surrounding environment. Unfortunately, despite its importance, a recent study revealed lab. workers often fail to follow hand washing policies. So, in recognition of Global Hand Washing Day (celebrated annually on October 15), EHS Biosafety staff wanted to remind everyone about the importance of hand washing.

Although appropriate gloves should be worn when handling hazardous materials, gloves do not eliminate the need for regular and proper hand washing. Failure to wash your hands after removing your gloves may result in transmission of pathogens from your hands to your mucous membranes, causing infection, or contamination of nearby surfaces, posing a risk to others in the lab.

Hands must be washed with soap and running water after handling chemicals, bio hazardous materials or animals, before leaving the lab.; and before eating. In most situations, thorough washing of hands with ordinary soap and water is sufficient to decontaminate them, but the use of germicidal soaps is recommended in high-risk situations. Alcohol-based hand-rubs should be used to decontaminate lightly soiled hands when proper hand washing is not available.

Healthcare professionals caring for high-risk patients that are immuno-compromised must take great care in performing proper hand hygiene as this patient population is at high risk for opportunistic infections. Handwashing with soap and water will remove nearly all transient gram-negative bacilli in 10 seconds while chlorhexidine may be more appropriate than soap and water for the removal of transient gram-positive bacteria.

Handwashing is a requirement if potential there was potential exposure to *Clostridium difficile*, Norovirus, or *Bacillus anthracis*. *Clostridium difficile* and *Bacillus anthracis* contain spores, and none of the agents used in antiseptic handwash or hand-rub preparations are reliably sporicidal. In these cases, vigorous handwashing with soap will assist in the removal of the spores from the skin.

According to the CDC, established guidelines recommend that agents used for surgical hand scrubs

should reduce microorganisms on intact skin in a substantial manner, contain a non-irritating antimicrobial preparation, have broad-spec. activity, and be fast-acting and persistent. Studies have demonstrated that formulations containing 60% to 95% alcohol alone or 50% to 95% in combination with other products lower bacterial counts on the skin immediately post-scrub more effectively than other agents.

CLINICAL SIGNIFICANCE

Hand hygiene practices are paramount in reducing cross-transmission of microorganisms, hospital-acquired infections and the risk of occupational exposure to infectious diseases.

Mortality and morbidity increase in the presence of hospital-acquired infections, thus diligent hand hygiene is essential to providing safe, cost-eff., quality care to our patients.

Educational programs for patients and healthcare providers, ergonomics, and staffing ratios all play a role in hand hygiene compliance.

Problem Statement

A descriptive study to assess the risk of health care associated infection due to practice of poor hand hygiene in health care set-up in Balaji Hospital, Delhi.

General Objective: Lab. workers are at risk of infection because of their daily exposure to micro-organisms. Consequently, many cases of lab.-associated infections have been reported. OSHA, CDC and many other groups provide standards and guidelines for lab. safety. Hand hygiene is an important element of all these standards. While health-care workers (HCW) in patient care should disinfect their hands mainly to prevent transmission of pathogens to patients, lab. personnel should do so to protect themselves.

Specific Objectives:

i. To assess the risk of health care associated infection due to practice of poor hand hygiene while handling microbes.
ii. To develop the awareness of hand Hygiene.
iii. To teach technique of good hand hygiene and their indications.

METHODOLOGY:

- By assessing the risk of health care associated infection due to practice of poor hand hygiene in

lab. or in any areas of Hospital.

- By making awareness posters.
- By Health Education.

Operational Definition

Assess: - To find out the proper knowledge and practice of Hand Hygiene.

Microbiology: Microbiology is the study of all living organisms that are too small to be visible with the naked eye. This includes bacteria, viruses, fungi, prions, protozoa and algae, collectively known as 'microbes'.

Healthcare-associated infections: HAIs are infections people get while they are receiving health care for another condition. HAIs can happen in any health care facility, including hospitals, ambulatory surgical centers, end-stage renal disease facilities, and long-term care facilities. Bacteria, fungi, viruses, or other, less common pathogens can cause HAIs.

Hand hygiene: it is also known as hand washing, is the act of cleaning one's hands with soap or handwash and water to remove viruses/bacteria/microorganisms, dirt, grease, or other harmful and unwanted substances stuck to the hands.

Assumptions:-

Proposed study assumes that:

- Participants will respond honestly.
- Participants may possess some basic knowledge regarding hand hygiene.
- Demonstration of procedure of hand washing and questionnaire will be appropriate to assess the knowledge of health care provider about hand hygiene.

Conceptual Framework

Concept is defined as a complex mental formulation object, project or event that is derived from individual perceptions and experiences.

Conceptual model is a representation or a systematic description of an object or phenomenon that shares important characteristics with another object or it is a symbolic representation of a concept. A conceptual model provides a unique focus that has profound influences on our perceptions.

According to Miles and Huberman (1994), conceptual framework is a written or visual presentation that

explains the main things to be studied in either graphically or narrative forms the key factors, concepts or variables and the presumed relationship among them.

According to Polit and Hungler (1995), Conceptual framework represents a less formal and less developed mechanism for organizing phenomenon than theories. As the name implies conceptual framework deals with abstraction (concept) that are assembled by virtue of their relevance to a common theme. Conceptual scheme use concept as building blocks. Conceptual framework work can serve to guide research that will further support.

According to Jabareen (2009), Conceptual framework is a network, or "a plane," of interlinked concepts that together provide a comprehensive understanding of a phenomenon or phenomena. The concepts that constitutes conceptual framework support one another, articulate their respective phenomena, and establish a framework-specific philosophy.

The conceptual framework selected for the study was based on **General System Theory** by **Ludwig Von Bertalanffy, 1968.**

According to Bertalanffy general system theory, a system is a group of elements that interact with one another in order to achieve the goal. An individual is a system; he or she receives input from the environment.

This input when implement provides an output. This system is cyclical in nature, and continues to be so, as long as these parts keep interacting. If there are changes in any of these parts, there will changes in all the parts. In the present study these can be explained as follows:

Input: Any type of input in the form of information or even the manual effort, which are processed by the system to get the desired output.

In the present study, the input is participant's data regarding hand hygiene performed before and after handling lab. equipments.

Throughput: It refers to the actions needed to accomplish the desired task.

- To assess the effect of hand hygiene teaching.

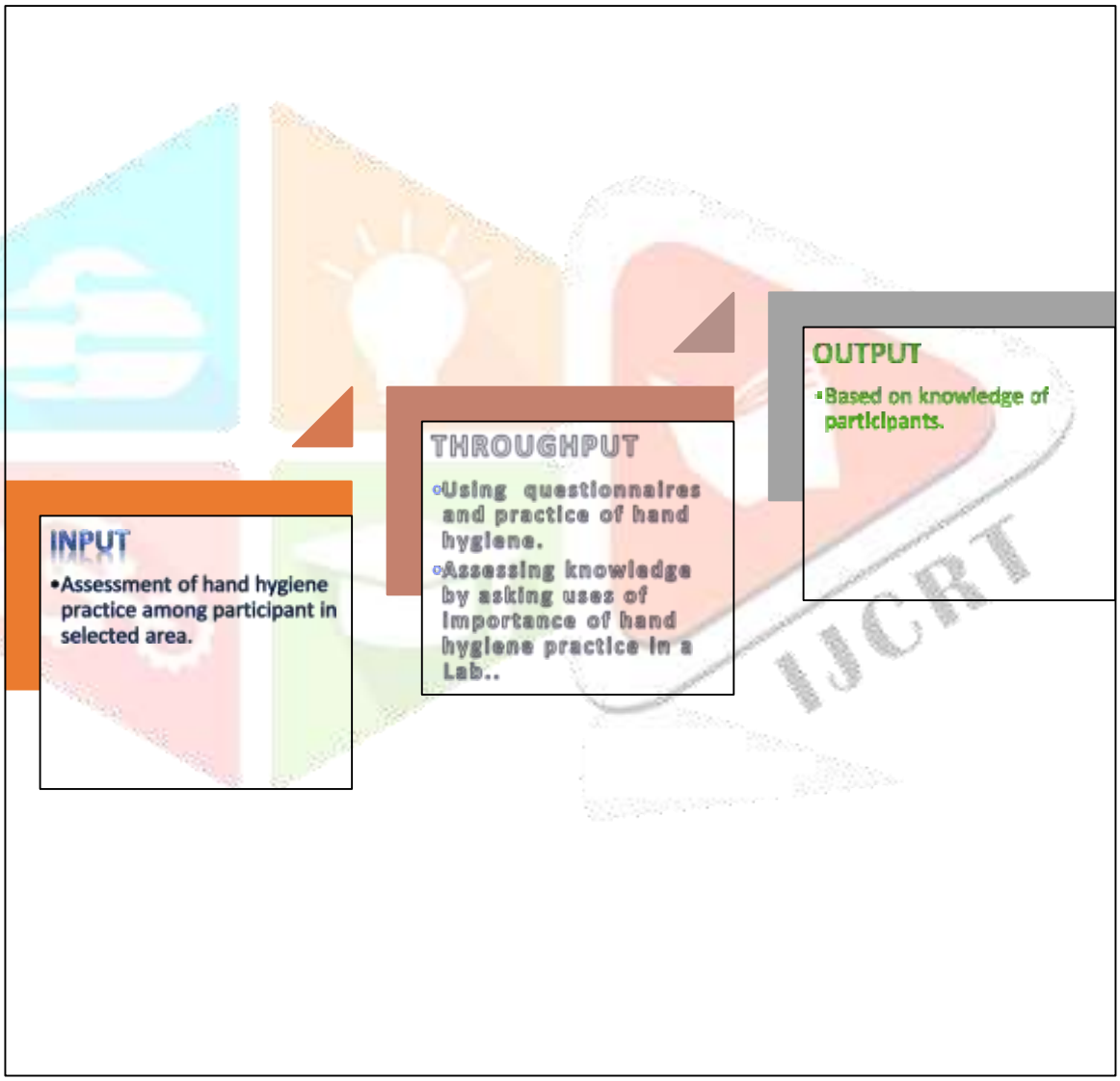
- The process used for assessing the effect was by using demonstration steps of hand hygiene.

Output: It refers to the result of the study.

In the present study, the output is based on responses of the subject to the questionnaire.

Feedback:

Feedback refers to the process by which information is received at each stage of the system and feedback as input to guide/direct in its evaluation.



Conceptual framework based on General System theory By LUDWIG VON BERTANLANFY-1968

INTRODUCTION

Hand hygiene is a method of hand cleansing that sign. minimises possible pathogens (harmful germs) on

the hands. Hand hygiene is regarded as a primary measure for lowering the risk of infection transmission among patients and health care staff. Hand hygiene treatments include the use of alcohol-based hand rubs (containing 60%-95% alcohol) and soap and water hand washing. Before putting on sterile surgeon's gloves for surgical procedures, perform a surgical hand scrub.

Purposes of Hand Hygiene in Microbiology lab.:

The purposes of hand hygiene are:

- Hand washing can prevent infection
- Avoid pathogenic microorganisms and to avoid transmitting them.
- Handling culture media in aspetic manner to avoid cross infection and false reading.

Types of Hand Hygiene:

The following are the types of hand hygiene:

- **Routine handwash:** Use of water and non-antimicrobial soap for the purpose of removing soil and transient microorganisms.
- **Antiseptic handwash:** Use of water and antimicrobial soap (e.g., chlorhexidine, iodine and iodophors, chloroxylenol [PCMX], triclosan) for the purpose of removing or destroying transient microorganisms and reduce resident flora.
- **Antiseptic handrub:** Use of alcohol-based handrub.
- **Surgical antisepsis:** Use of water and antimicrobial soap (e.g., chlorhexidine, iodine and iodophors, chloroxylenol [PCMX], triclosan) for the purpose of removing or destroying transient microorganisms and reduce resident flora. Recommended duration is 2-6 minutes.

5 Moments of Hand Hygiene of Lab.:

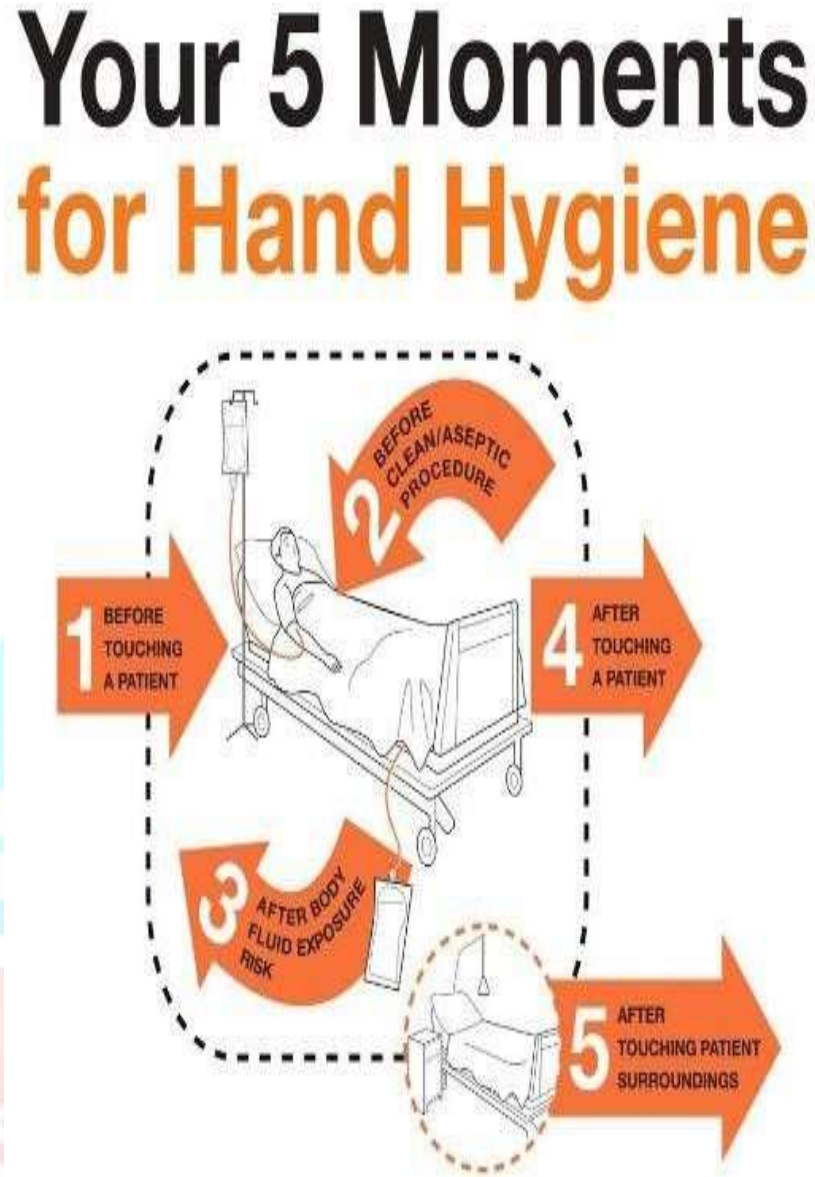
- After removing lab. coat
- Before entering a clean area
- Before touching a clean surface
- Before leaving lab.
- Hands visibly soiled/contaminated

Hand Hygiene of Lab.:

Indicators of Hand Hygiene

According to the World Health Organization (WHO), there are Five Moments for Hand Hygiene:

- Before Patient Contact.
- Before and Antiseptic Task.
- After Body Fluid Exposure Risk.
- After Patient Contact.
- After Contact with Patient Surroundings.

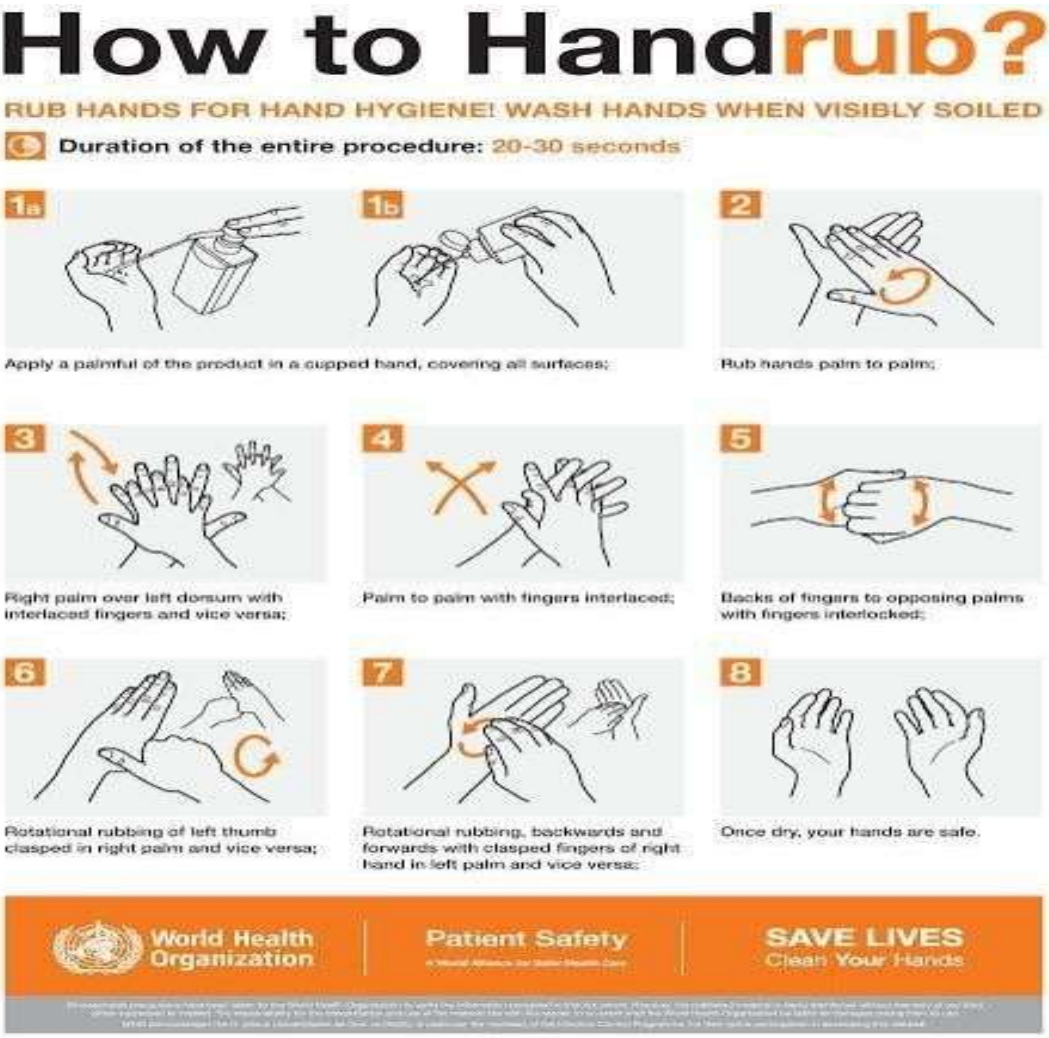


Procedure of Hand Hygiene in Lab.:

Below are the step-by-step guide for different hand hygiene methods:

1. **Antiseptic Handrub:** The use of alcohol-based handrub.

- Ensure jewellery has been removed
- Apply quantity of alcohol-based hand hygiene product as per manufacturer's recommendations into cupped hand.
- Rub hands palm to palm.
- Right palm over left dorsum with interlaced fingers and vice versa.
- Palm to palm with fingers interlaced.
- Backs of fingers to opposing palms with fingers interlaced.
- Rotational rubbing of left thumb clasped in right palm and vice versa.
- Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa.



Antiseptic Handwash

Also known as clean technique, includes procedures used to reduce the number of organisms on hands.

- Gather the necessary supplies. Stand in front of the sink.
- Wet the hands and wrist area. Keep hands lower than elbows to allow water to flow towards the fingertips.
- Cover all areas of hands with soap.
- With firm rubbing and circular motions, wash the palms and backs of the hands, each finger, the knuckles, wrists, and forearms. Continue this friction motion for 30 seconds.
- Rinse thoroughly with water flowing towards the fingertips.

CHAPTER

ANALYSIS AND INTERPRETATION

- This chapter deals with the analysis and interpretation of the data collected during the study to assess the effect of online classes on eye health of school going adolescent children from class 9th to 12th in selected schools of Sonipat, Haryana.
- Analysis is to organize the data in the desired format and the most understandable way. It involves the statistical procedure that enables the investigator to organize, interpret, analysis, summarize, evaluate and communication of the data in numerical form.
- **Kerlinger (1983)** defines analysis as the "the categorizing, ordering, manipulating and

summarizing of the data to obtain answers to the research questions." The purpose of analysis is to reduce data to an intelligible and interpretable form, so that the relation of research problem can be studied and tested.

- **Abdellah and Levine (1979)** have stated that interpretation of tabulated data can bring into light the real meaning of the findings of the study.
- **Polit and Hungler (1999)** stated that data analysis is the systematic organization and synthesis of research data and the testing of research hypothesis using those data.
- In this study, analysis and interpretation of data were based on data collected through a self-structured questionnaire on eye health of school going adolescent children from class 9th to 12th in selected school of Sonipat, Haryana. Both descriptive and inferential statistics were used for analyzing the data. The data was analyzed using SPSS software.

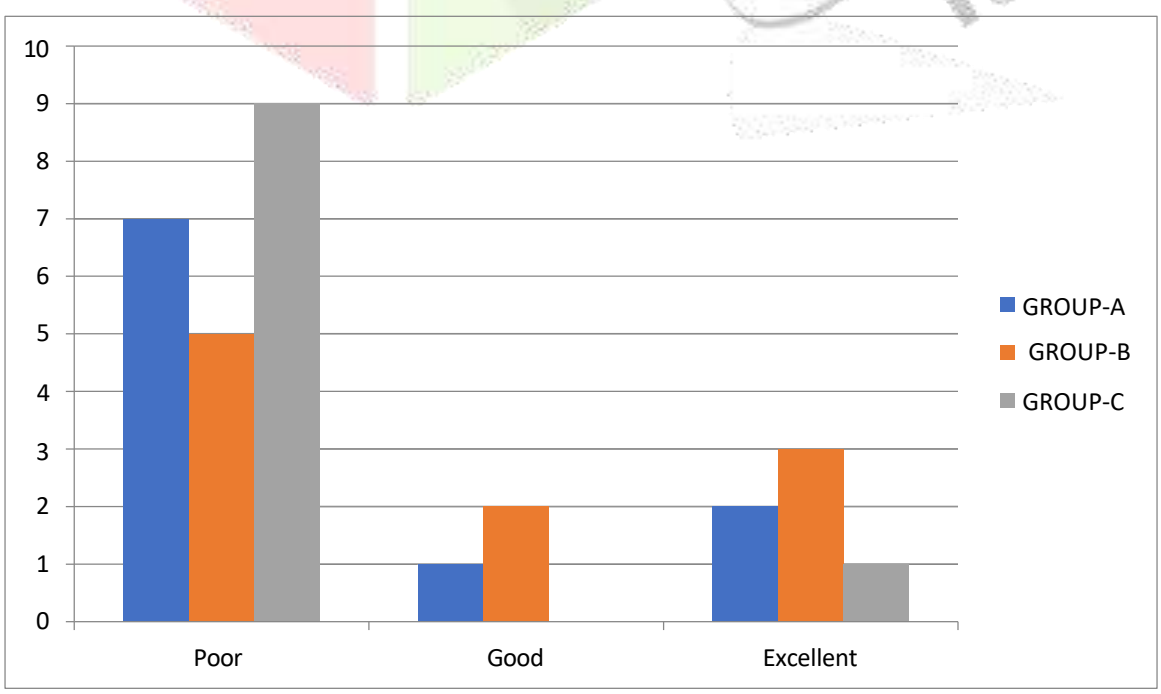
AIMS OF THE STUDY

A descriptive study to assess the risk of health care associated infection due to practice of poor hand hygiene in health care set-up.

Specific Objectives:

i. To assess the risk of health care associated infection due to practice of poor hand hygiene while handling microbes.
ii. To develop the awareness of hand Hygiene.
iii. To teach technique of good hand hygiene and their indications.

On the basis of assessment participants found poor knowledge regarding hand hygiene.



We made 3 groups i.e Group-A, Group-B and Group-C:

- Among them in Excellent knowledge having participant in numerals 2, 3 and 1 in Group-A, Group-B and Group-C respectively.
- Among them in Good knowledge having participant in numerals 1, 3 and 0 in Group-A, Group-B and Group-C respectively.
- Among them in Poor knowledge having participant in numerals 7, 5 and 9 in Group-A, Group-B and Group-C respectively.

CHAPTER

DISCUSSION

This chapter deals with the discussion of the findings related to the study, whether the present objectives are achieved or not. The major findings of the present study have been discussed with reference to the result obtained by other investigators in the same aspects. The discussion of the findings is much more subjective section of a research report than presenting of findings. The discussion of findings section of the study allows the researcher to make interpretation of the findings.

The present study was conducted to assess the risk of health care associated infection due to practice of poor hand hygiene in health care set-up.

In order to achieve the objective of the study, one group test was adopted for this study on 30 study subjects those who were fulfilling inclusion criteria were selected by non-probability consecutive sampling technique. The samples were assessed on the basis of self-structured questionnaire.

The findings in the study were discussed under the objectives in the following order: -

INFORMATION REGARDING DEMOGRAPHIC CHARACTERSTICS OF THE STUDY

Total number of Participants= 30

- Among them in Excellent knowledge having participant in numerals 2, 3 and 1 in Group-A, Group-B and Group-C respectively.
- Among them in Good knowledge having participant in numerals 1, 3 and 0 in Group-A, Group-B and Group-C respectively.
- Among them in Poor knowledge having participant in numerals 7, 5 and 9 in Group-A, Group-B and Group-C respectively.

CHAPTER

SUMMARY, CONCLUSION and RECOMMENDATIONS

This chapter deals with summary of the whole study; which includes the statement of problem, objectives, assumptions, conceptual framework, review literature, research methodology, statistical inference, major findings of the study and the conclusion drawn from different areas of research.

SUMMARY

The Primary Aim is to assess practice of poor hand hygiene in health care set-up. Lab. workers are at risk of infection because of their daily exposure to micro-organisms. Consequently, many cases of lab.-associated infections have been reported. OSHA, CDC and many other groups provide standards and guidelines for lab. safety. Hand hygiene is an important element of all these standards. While health-care workers (HCW) in patient care should disinfect their hands mainly to prevent transmission of pathogens to patients, lab. personnel should do so to protect themselves. Over the last decennia the promotion of hand hygiene among HCWs was a major component of infection control programs and research – primarily Directed to patient care.

The statement of the problem was "To assess the risk of health care associated infection due to practice of poor hand hygiene in health care set-up."

The study was conducted with the following objectives:

i. To assess the risk of health care associated infection due to practice of poor hand hygiene while handling microbes.
ii. To develop the awareness of hand Hygiene.
iii. To teach technique of good hand hygiene and their indications.

The study was based on the following assumptions:

- Participants will respond honestly.
- Participants may possess some basic knowledge regarding hand hygiene.
- Demonstration of procedure of hand washing and questionnaire will be appropriate to assess the knowledge of health care provider about hand hygiene.

The conceptual framework adopted for this study was based on **General System Theory by Ludwig Von Bertalanfy -1968.** This model was based on that system consists of two or more converted elements which form an organized whole and which interact with each other rather than loss of single function. In all system actively can be resolved into an aggregation of feedback, circuits such as, input, throughput and output. The system acts as a whole dysfunction of a part causes a system disturbance. The feedback circuit helps

in the maintenance of an intact system.

An extensive review of literature of research and non-research was done to gain knowledge of the problem area and build the foundation of the study. The literature reviews further enabled the investigator to develop a conceptual framework, the methodology and the plan for data analysis.

In the present study cross sectional research design was used that is a type of non- experimental research design. The sample size of 30 participants. Only those subjects were included in the study who were willing to take part and who were available at the time of the data collection. Tool validated by research committee members.

Major finding of the study:

- Among them in Excellent knowledge having participant in numerals 2, 3 and 1 in Group-A, Group-B and Group-C respectively.
- Among them in Good knowledge having participant in numerals 1, 3 and 0 in Group-A, Group-B and Group-C respectively.
- Among them in Poor knowledge having participant in numerals 7, 5 and 9 in Group-A, Group-B and Group-C respectively.

CONCLUSION

"I am a firm believer in people. If given the truth, they can be depended upon to meet any national crisis. The great point to bring them real facts."

-Abraham Lincoln

After the result were analyzed based on the calculated values from the previous output, this research makes the following conclusions:

- Further teaching are necessary to prevent HAI.
- Regular assignment must be provided by the tean leader to upgrade knowledge.
- Workshop on requirement basis must be conducted in every Health care setup.

RECOMMENDATIONS

"Confrontation doesn't always bring a solution to the problem, but until you confront the problem, there will be no solution."

- James Baldwin

After analysis of the data, the following recommendations are hereby made:

- A similar study can be conducted by using the other strategies by developing information booklets or by educating teachers.
- Same study can be done on all HCPs..
- In the same setting experimental study with taking large samples can be done.
- The Comparative study can be done

LIMITATIONS

The limitations recognized in the study are:

- This study is only limited to one setup.
- The study was limited to assess the of hand hygiene practice in microbiology lab..
- The study was limited to the 30 samples only.
- The data was collected by using the Non probability consecutive sampling techniques.
- The study was limited to students who are willing to participate in the study.

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