Significance of Hand Hygiene in Clinical Practice and Literature Review

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INTRODUCTION

Hand hygiene is an integral part of the health care system. The concept of cleansing hands with antiseptic agents dates back to as early as 19th century. One of the earliest papers was published in 1829 by a French pharmacist who stated that physicians and other persons attending patients with contagious diseases would benefit from moistening their hands with a liquid chloride solution (*Labarraque AG. 1829*). Since the 19th century, the benefits of hand hygiene have been studied extensively. Recent developments in the field have stimulated a review of the scientific data regarding hand hygiene and the development of new guidelines designed to improve hand-hygiene practices in health-care facilities. Various guidelines have been published by the World Health Organization (WHO) in terms of hand hygiene, and recommendations regarding the same have been prepared by a Hand Hygiene Task Force, comprising of representatives from the Healthcare Infection Control Practices Advisory Committee (HICPAC), the Society for Healthcare Epidemiology of America (SHEA), the Association for Professionals in Infections Control (APIC), and the Infectious Diseases Society of America (IDSA).

In this review we will discuss the evolution and development of practices related to hand hygiene over time and their implications in clinical settings.

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What is hand hygiene?

Hand Hygiene means the cleaning of hands by using either handwashing with soap and water, antiseptic hand wash or antiseptic hand rub, i.e. alcohol-based hand sanitizer including foam or gel (*Allegranzi B, et al., J Hosp Infect 2009*).

In healthcare settings, hand hygiene is the single most important measure to reduce transmission of micro-organisms from one person to another or from one site to another on the same patient. The primary challenge associated with hand hygiene efficacy is laxity of practice, not a paucity of good products (*Pittet D. et al., Lancet Infect Dis 2006; 6:641*)

Why hand hygiene is important?

Healthcare workers hands are the most common vehicle for the transmission of healthcare-associated pathogens from patient to patient and within the healthcare environment. Hand hygiene is the leading measure for preventing the spread of antimicrobial resistance and reducing healthcare-associated infections (HCAIs), (*Allegranzi B, et al., 2009*). In the 1960s, a prospective, case controlled trial sponsored by the National Institutes of Health and the Office of the Surgeon General demonstrated that when compared with no hand-washing, washing hands with an antiseptic agent between patient contacts reduces transmission of healthcare-associated pathogens. Trials have studied the effects of hand-washing with plain soap and water versus some form of hand antisepsis on HCAI rates. These trials showed several findings: 1) HCAI rates were lower when antiseptic hand-washing was performed compared to no handwashing; 2) HCAI rates were lower after antiseptic

hand-washing using a chlorhexidine-containing detergent compared with hand-washing with plain soap or use of an alcohol-based hand rinse. However, because only a minimal amount of the alcohol rinse was used during periods when the combination regimen also was in use and because adherence to policies was higher when chlorhexidine was available, determining which factor (i.e., the hand-hygiene regimen or differences in adherence) accounted for the lower infection rates was difficult. Investigators have determined also that healthcare-associated acquisition of MRSA was reduced when the antimicrobial soap was used for handwashing. Increased handwashing frequency among hospital staff has been associated with decreased transmission of *Klebsiella* spp. among patients; this study, however, did not quantitate the level of hand-washing among personnel (Luangasanatip N, et al. *BMJ* 2015). In a recent study, the acquisition of various healthcare associated pathogens was reduced when hand antisepsis was performed more frequently by hospital personnel (Boyce JM, et al., *MMWR Recomm Rep* 2002); both this study and another documented that the prevalence of healthcare-associated infections decreased as adherence to recommended hand-hygiene measures improved. Outbreak investigations have indicated an association between infections and understaffing or overcrowding; the association was consistently linked with poor adherence to hand hygiene. (Gould DJ, et al., *Cochrane Database Syst Rev* 2007)

The studies cited above and a plethora of published evidence (Muto CA, et al., *Infect Control HospEpidemiol.* 2005, Boyce JM, et al., *Infect Control HospEpidemiol* 2006, Kretzer, EK, et al., *Am J Infect Control* 1998) show that the "Transmission of microorganisms from the hands of healthcare workers is the main source of cross-infection in hospitals and can be prevented by hand washing" (AkyolAD ; *J ClinNurs* 2007).

When is hand hygiene important?

Hand hygiene should start when HCW enter the premises of health care providing area. Clean Your Hands initiative is part of a major global effort led by the World Health Organization (WHO); it includes "My Five Moments for Hand Hygiene," [Figure 1] which define the key moments when health care workers should perform hand hygiene. (WHO. *Save Lives. Clean your hands.* 2017)

- Before touching a patient
- Before clean/aseptic procedures

- After body fluid exposure/risk
- After touching a patient
- After touching patient's surroundings

Where should hand hygiene be practiced?

Hand hygiene should be followed in hospital premises. Most hospitals and clinics emphasize hand hygiene at the time of room entry and exit and prior to any procedure. Transmission of microorganisms from the hands of HCWs is the main source of cross-infection in hospitals and can be prevented by hand washing. Identifying predictors of non-compliance with hand washing during routine patient care is important (Creedon SA. 2005) and provides appropriate instances for intervention and behavior change (HugonnetS,et al.2002). The instances of maximum contact of health care workers (HCWs) with patients and microorganisms takes place in the following high risk zones:

- Accident and Emergency Department
- Outpatient Departments
- Inpatient Departments
- Intensive Care Units
- Operation theatres
- Laboratories
- Radiology units

Who needs hand hygiene?

All HCWs including doctors, nurses, nursing aids, operation theatre technicians, X-RAY technicians, physiotherapists who are in direct contact with patient care systems should follow regular hand hygiene protocols.

Any HCW, caregiver or person involved in direct or indirect patient care needs to be concerned about hand hygiene and should be able to perform it correctly and at the appropriate time.

Any attendant or visitor of the patient in inpatient departments, wards, critical care units should perform hand hygiene before and after touching the patient or patient's surroundings.

How should hand hygiene practice be implemented?

Different solutions and materials can be used to perform hand hygiene.

Soap and water — Hand hygiene with soap and water should be performed as summarized in Figure 2.

Alcohol-based hand disinfection (AHD)— AHD is an effective, inexpensive, and practical alternative to soap and

water [Figure 2]. AHD is faster and easier to perform than hand washing with soap and water; it should be performed at every room entry and exit and prior to any procedure. The use of AHD has been associated with improved hand hygiene compliance rates and reductions in nosocomial infections (Pittet D, et al. 1999). AHD products have rapid antimicrobial effects and are as effective as chlorhexidine against gram-positive and gram-negative organisms as well as viral pathogens including influenza. AHD products do not have activity against norovirus or spore-forming bacteria, including *C. difficile*.

The United States Centers for Disease Control and Prevention (CDC) endorses a three-step method for AHD (apply sanitizer and rub both palms together, cover all surfaces, and rub until dry), whereas the WHO endorses a six-step method (apply sanitizer and specifically rub six different aspects of the hands and fingers). In a randomized trial comparing these two methods among 120 doctors and nurses at an acute care hospital, those assigned to the six-step method had a greater reduction in the bacterial count of their hands but took approximately 8 seconds longer to complete hand hygiene and had lower compliance (65 versus 100 percent). Hospital transmission or infection rates were not measured. We continue to favor the three-step CDC AHD method because it is practical and the difference in the bacterial count reduction is of uncertain clinical significance.

DISCUSSION

Hand washing should become an educational priority. Educational interventions for medical students should provide clear evidence that HCWs' hands become grossly contaminated with pathogens upon patient contact and that alcohol hand rubs provide an easy and effective means of decontaminating hands, thereby reducing the rates of HAIs. Increasing the emphasis on infection control, giving the charge of infection control to all HCWs at every level, changing the paradigm of surveillance to continuous monitoring and effective data feedback are some of the important measures which need to be initiated in Indian hospitals.

The WHO has led the charge of promoting patient safety by launching the First Global Patient Safety Challenge, to emphasize hand hygiene practices worldwide with the ultimate goal of promoting a strong patient safety culture. The health care practitioners in our country need to embrace

this challenge to practice hand hygiene as routine and necessary, and thereby serve as a role models for future generations of doctors, nurses and paramedical personnels.

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Figure 1: The 5 moments of hand hygiene (Adapted from: WHO)

How to handrub?

RUB HANDS FOR HAND HYGIENE! WASH HANDS WHEN VISIBLY SOILED

⌚ Duration of the entire procedure: 20-30 seconds

How to handwash?

WASH HANDS WHEN VISIBLY SOILED! OTHERWISE, USE HANDRUB

⌚ Duration of the entire procedure: 40-60 seconds

Figure 2: The correct technique for hand rub and hand wash (Adapted from: WHO)