

Back to Basics: Understanding Hand Hygiene and Quarantine

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Abstract: *This paper focuses extremely significance of hand hygiene in the present day scenario to prevent the spread of contagious and the COVID-19 virus. It analysed hand hygiene, quarantine basics, issues of hand hygiene, hygiene products, practices, and how to wash hand. It also focused some historical perspective of health and Quarantine. Preventing the spread of Coronavirus (COVID-19) is possible with clean water, decent sanitation and good hygiene. Recent insights of hand hygiene proved that water is a foundation of life and livelihoods, and the daily practice of hand hygiene creates immense benefits, and it also provides proper recommendations.*

Key words: *Hand hygiene, alcohol-based hand rub, quarantine, water, isolation.*

1. INTRODUCTION:

The human palm has been identified as one of the most productive habitats for social microbial accommodation making hand hygiene (HH) essential to primary prevention of infection. Since the hand is in constant contact with fomites which have been proven to be most contaminated, building hand hygiene habits is essential for the prevention of infection, Timothy (2019). Hand hygiene practices, as a critical component of infection prevention/control, were investigated among physiotherapists in an Ebola endemic region Ibeneme (2017). Recent experience with emerging infectious diseases has highlighted the role of isolation in outbreak settings. However, new studies have also emphasised the limitations, and even adverse effects, of isolation under certain circumstances Huang (2014).

Preventing the spread of Coronavirus (COVID-19) is almost impossible without clean water, decent sanitation and good hygiene. Currently, 785 million people globally lack access to clean water, and 2.3 billion are without safe, private toilets. In the poorest countries, almost half (45%) of health care facilities do not have clean water on site. One in five healthcare facilities (21%) globally do not provide decent toilets and one in six health care facilities have no handwashing facilities at all. Data shows that hygiene services, including the ability to wash hands with soap in healthcare facilities, are often lacking. For example, in Eastern and South-Eastern Asia, just one in three healthcare facilities (36%) had facilities to allow for handwashing with soap. Only one in four (27%) healthcare facilities in the least developed countries could safely dispose of medical waste. Handwashing has been shown to reduce cases of all respiratory diseases by 20% and diarrhoea by 30% and can help healthcare centres be better placed to support a response to an outbreak Emily (2020). Water is a foundation of life and livelihoods and is key to sustainable development. Successful water management will serve as a foundation for the achievement of many of the 17 Sustainable Development Goals (SDGs), as well as for SDG6- which is to 'Ensure availability and sustainable management of water and sanitation for all' Lal(2019).

1.1. PURPOSE OF REVIEW:

Hand hygiene and Quarantine are beneficial, means of preventing the spread of pathogens in healthcare. Although the principle may be straightforward, this review highlights why, who and how hygiene, hand hygiene products, practices and, historical perspective. It focuses on Quarantine, history of quarantines and some of the recommendations regarding the implementation and efficacy of these interventions.

2. STUDIES ON HAND HYGIENE:

Diseases that are carried in the air through coughing, sneezing or even breathing, such as measles, tuberculosis (TB), whooping cough and pneumonia. Today there are 12 million TB cases (an average of 70%). Over 1.2 million cases are added every year, and 37 000 cases of measles are reported every year Lal(2012).

Personal hygiene includes different habits, i.e., washing hands and brushing teeth which keep bacteria, viruses and fungal, far away from our bodies. Moreover, these habits will help us to protect our mental health and activity. Also, good personal hygiene will help us to keep feeling good about ourselves. Since those who do not take care of their hygiene, i.e., dirty clothes, body odour and bad breath will suffer from discrimination, and this will mainly lead to mental problems. However, the most crucial point in this subject is that all people have their hygiene, but some people do it better than others, this mainly depends on each person's culture, society and family norm Lal(2016).

After anaemia, the respiratory disease, including upper respiratory tract infection was more commonly prevalent (14.9% in Bondo, 16.6% in Days, 13.6% in Kondha and 8.3% in Juanga). It accounted for high infant mortality due to inadequate vaccination, lack of early diagnosis and prevention (GP Chhotray: Unpublished observation). Similar observations were made in Birhor (11.2%) and Sahariya (57.5% in children aged 0-4 years and 56.9% in children aged 5-14 years) tribes of Madhya Pradesh Lal(2011). Sanitation: (Open defecation): more than 87 per cent of banjaras are openly defecating at roadsides, open agricultural fields, nearby canal and bank of canal and rivers Lal(2015).

The study shows the family discrimination of the respondents. Out of 300 respondents, about 73% of the respondents are living with their families, and 27% of the respondents are separated or driven away by their families. This shows the awareness and suitable emotional attachments among families, and it is one of the causes to be attached to remain with their families. Notably, female respondents face much discrimination than males after having suffered these diseases. As most of the males are earning something, they are treated well in society or the family, but the females are facing problems Lal(2010).

The Global Burden of Disease study (1997) estimated that in 1990, alcohol was responsible for 773 600 deaths, 19.3 million years of life lost and 47.7 million disability-adjusted life years lost worldwide. The level of harm is related to the pattern, including standard, of drinking in a country, with overall mortality rising by 1.3percent for every extra litre of pure alcohol consumed per capita Naik(2013).

In terms of water, there is a much more favourable scenario, as the report finds that significant progress has been made in this area as it is the first time where the number of people without improved drinking-water has dropped below 1 billion. More than half of the global population now benefits from piped water reaching their homes, and the numbers using unimproved water supplies are going down Kavitha(2013).

Severe Symptoms: Headaches, Blurred and distorted vision, Cough and shortness of breath, Persistent white spots or unusual lesions on your tongue or in your mouth, Soaking night sweats, Shaking chills or fever higher than 100 F (38 C) for several weeks, Chronic diarrhoea, Persistent, unexplained fatigue, Weight loss, Skin rashes Lal (2017).

Hand washing with soap is an effective way to prevent infection in healthcare facilities. A study of healthcare facilities in 54 countries found that 35% failed to offer soap and water for hand washing. On average, 61% of healthcare workers are not adhering to best hand washing practices WHO(2016). Each year, healthcare-associated infections affect 15.5% of patients in developing countries, and antimicrobial resistance leads to 700,000 deaths Allegranzi (2011).

2.1. DEFINITION OF HYGIENE:

The word hygiene has evolved from the Greek term "Hygeia" which means "Goddess of Health". Hygiene can be defined as, "The science and art which is associated with the preservation and promotion of health" Lal(2016).

Why HH: Thousands of people die every day around the world from infections acquired while receiving health care. Hands are the main pathways of germ transmission during health care. Hand hygiene is, therefore, the essential measure to avoid the transfer of harmful germs and prevent healthcare-associated infections. This brochure explains how and when to practice hand hygiene. **Who.** Any healthcare worker, 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 right time. **How.** Clean your hands by rubbing them with an alcohol-based formulation, as the preferred mean for routine hygienic hand antisepsis if hands are not visibly soiled. It is faster, more productive, and better tolerated by your hands than washing with soap and water. Wash your hands with soap and water when hands are visibly dirty or visibly soiled with blood or other body fluids or after using the toilet. If exposure to potential spore-forming pathogens is strongly suspected or proven, including outbreaks of *Clostridium difficile*, hand washing with soap and water is the preferred means.

2.1.1. HH PRODUCTS:

Alcohol-based (hand) rub. An alcohol-containing preparation (liquid, gel or foam) designed for application to the sides to inactivate microorganisms and temporarily suppress their growth. Such developments may contain one or more types of alcohol, other active ingredients with excipients, and humectants.

Antimicrobial (medicated) soap. Soap (detergent) containing an antiseptic agent at a concentration sufficient to inactivate microorganisms and temporarily suppress their growth. The detergent activity of such solvents may also dislodge transient organisms or other contaminants from the skin to facilitate their subsequent removal by water.

Antiseptic agent. An antimicrobial substance that inactivates microorganisms or inhibits their growth on living tissues. Examples include alcohols, chlorhexidine gluconate (CHG), chlorine derivatives, iodine, chloroxylenol (PCMX), quaternary ammonium compounds, and triclosan.

Antiseptic hand wipe. A piece of fabric or paper pre-wetted with an antiseptic used for wiping hands to inactivate and remove microbial contamination. They may be considered as an alternative to washing hands with non-antimicrobial soap and water but, because they are not as effective at reducing bacterial counts on HCWs' hands as alcohol-based hand

rub or washing hands with an antimicrobial soap and water, they are not a substitute for using an alcohol-based hand rub or antimicrobial soap.

Detergent (surfactant). Detergent compounds that possess a cleaning action. They are composed of a hydrophilic and a lipophilic part and can be divided into four groups: anionic, cationic, amphoteric, and non-ionic. Although products used for hand washing or antiseptic hand wash in health care represent various types of detergents, the term "soap" will be used to refer to such detergents in these guidelines. **Plain soap.** Detergents that contain no added antimicrobial agents, or may contain these solely as preservatives. **Waterless antiseptic agent.** An antiseptic agent (liquid, gel or foam) that does not require the use of exogenous water. After application, the individual rubs the hands together until the skin feels dry WHO(2009).

2.1.2.HH PRACTICES:

Antiseptic handwashing. Washing hands with soap and water, or other detergents containing an antiseptic agent.

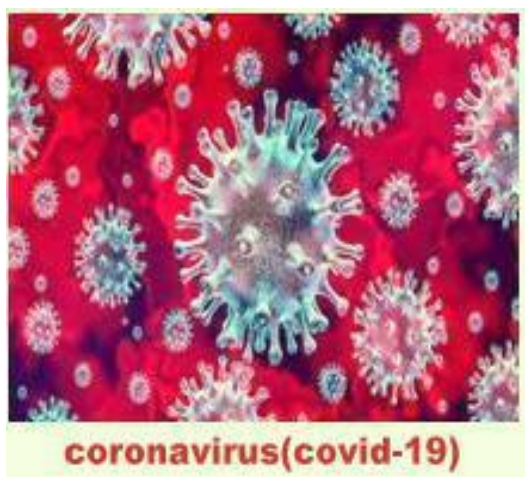


Figure 1. Novel Corona virus



Figure 2. How to wash hand and maintained hygiene

Antiseptic hand rubbing (or hand rubbing). Applying an antiseptic hand rub to reduce or inhibit the growth of microorganisms without the need for an exogenous source of water and requiring no rinsing or drying with towels or other devices. **Hand antiseptics/ decontamination/ degerming.** Reducing or inhibiting the growth of microorganisms by the application of an antiseptic hand rub or by performing an antiseptic hand wash. **Hand care.** Actions to reduce the risk of skin damage or irritation. **Hand washing.** Washing hands with plain or antimicrobial soap and water. **Hand cleansing.** The action of performing hand hygiene for physically or mechanically removing dirt, organic material, and microorganisms. Hand disinfection is extensively used as a term in some parts of the world and can refer to antiseptic hand wash, antiseptic hand rubbing, hand antiseptics/ decontamination/ degerming, hand washing with an antimicrobial soap and water, hygienic hand antiseptics, or hygienic hand rub. Since disinfection refers typically to the decontamination of inanimate surfaces and objects, this term is not used in these Guidelines. **Hygienic hand antiseptics.** Treatment of hands with either an antiseptic hand rub or antiseptic hand wash to reduce the transient microbial flora without necessarily affecting the resident skin flora. **Hygienic hand rub.** Treatment of hands with an antiseptic hand rub to reduce the transient flora without necessarily affecting the resident skin flora. These preparations are broad-spectrum and fast-acting, and persistent activity is not necessary.

Hygienic hand wash. Treatment of hands with an antiseptic hand wash and water to reduce the transient flora without necessarily affecting the resident skin flora. It is a broad spectrum, but is usually less efficient and acts more slowly than the hygienic hand rub.

Surgical hand antiseptics and preparation. Antiseptic hand wash or antiseptic hand rub performed preoperatively by the surgical team to eliminate transient flora and reduce resident skin flora. Such antiseptics often have persistent antimicrobial activity. Surgical hand scrub (bing)/ presurgical scrub refer to surgical hand preparation with antimicrobial soap and water. Surgical hand rub (bing) refers to surgical hand preparation with a waterless, alcohol-based hand rub WHO(2009).

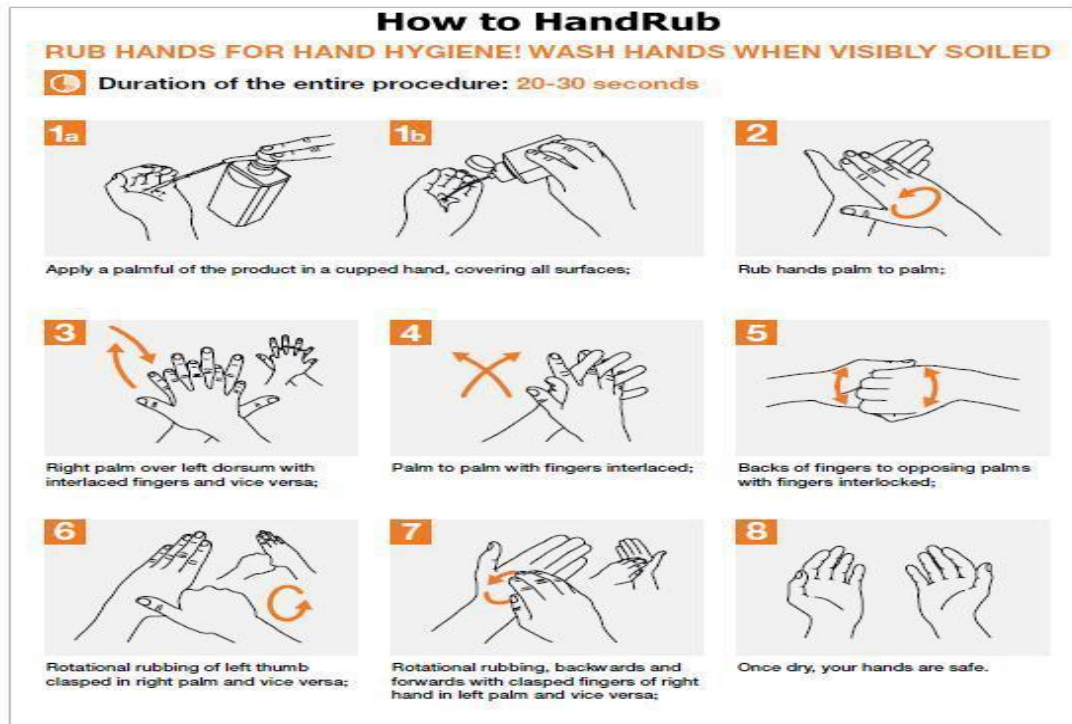


Figure 3. How to hand rub

3. HISTORICAL PERSPECTIVE ON HH IN HEALTHCARE:

In the mid-1800s, studies by Ignaz Semmelweis in Vienna, Austria, and Oliver Wendell Holmes in Boston, USA, established that hospital-acquired diseases were transmitted via the hands of HCWs. In 1847, Semmelweis was appointed as a house officer in one of the two obstetric clinics at the University of Vienna Allgemeine Krankenhaus (General Hospital). He observed that maternal mortality rates, mostly attributable to puerperal fever, were substantially higher in one clinic compared with the other (16% versus 7%).⁵⁰ He also noted that doctors and medical students often went directly to the delivery suite after performing autopsies and had a disagreeable odour on their hands despite hand washing with soap and water before entering the clinic. He hypothesised, therefore, that "cadaverous particles" were transmitted via the hands of doctors and students from the autopsy room to the delivery theatre and caused the puerperal fever. As a consequence, Semmelweis recommended that hands be scrubbed in a chlorinated lime solution before every patient contact and particularly after leaving the autopsy room. Following the implementation of this measure, the mortality rate fell dramatically to 3% in the clinic most affected and remained low after that. Apart from providing the first evidence that cleansing heavily contaminated hands with an antiseptic agent can reduce nosocomial transmission of germs more effectively than hand washing with plain soap and water, this approach includes all the essential elements for a successful infection control intervention: "recognise-explain-act".⁵¹ Unfortunately, both Holmes and Semmelweis failed to observe a sustained change in their colleagues' behaviour. In particular, Semmelweis experienced significant difficulties in convincing his colleagues and administrators of the benefits of this procedure. In the light of the principles of social marketing today, his considerable error was that he imposed a system change (the use of the chlorinated lime solution) without consulting the opinion of his collaborators. Despite these drawbacks, many lessons have been learnt from the Semmelweis intervention; the "recognise-explain" approach has driven many investigators and practitioners since then and has also been replicated in different fields and settings. Semmelweis is considered not only the father of hand hygiene, but his intervention is also a model of epidemiologically driven strategies to prevent infection.

4. ASSESSING ACCURACY APPROACHES:

Approaches to the monitoring of hand hygiene include direct observation, self-reporting, measurement of product consumption and use of various automated devices; each plan has strengths and weaknesses Haas (2007). Although no method is ideal, direct monitoring is generally considered the gold standard, although limitations include resource intensity, observer bias and the potential of a Hawthorne effect. Multiple factors can affect results, including the type of hand hygiene compliance audit tool used. Use of a standardised tool, such as the WHO 5 Moments tool, allows valid comparability between sites, although standardisation of assessors and wards surveyed requires careful attention, Huang(2014).

4.1. WHAT DOES QUARANTINE MEAN ?:

Quarantine is a state or place of isolation for a person or animal who may have come in contact with contagious diseases. The period of isolation lowers the chance that a person or animal could transfer illnesses to others. Quarantine is not reserved for sick people only. People who appear healthy could spread a pathogen without ever knowing they were carriers, which is why travellers who appear healthy may still be quarantined, depending on where they are visiting from Quarantine. Quarantine aims to separate and restrict the movement of people who have been exposed to a contagious disease to watch and see if they become sick. These people may have been exposed to an infection and do not know it, or they may have the disease but do not show symptoms. Quarantine helps to limit the spread of infectious disease. Because of the current COVID-19 Coronavirus pandemic, many people have been told to quarantine. Quarantining means staying home and away from other people as much as possible for 14 days. This includes avoiding shopping, eating out, socialising, public places, and large crowds.

5. BRIEF HISTORY OF QUARANTINES:

The concept of putting a sick person in isolation has been around for a very long time. One of the earliest examples is found in the book of Leviticus, which recommends isolating people with leprosy. That evidence suggests that although people at that time did not know about bacteria or viruses, they recognised isolation as a way to stop others from getting sick, according to a review published in The Virginia Tech Undergraduate Historical Review. The practice of Quarantine as are familiar with it likely began in the middle Ages, according to the Centers for Disease Prevention and Control. In the 14th century, ships arriving in Venice from areas struck with the Black Death (bubonic plague) were required to anchor away from port for 40 days before docking. The Italians called it "Quaranta giorni," or "40 days," which evolved into "quarantine." The 40-day Quarantine was so effective that it became standard practice in Europe for the next 300 years. In the United States, the Commonwealth of Philadelphia opened a quarantine station on the Delaware River in 1799 after the yellow fever epidemic of 1793 that killed around 5,000 people. In the 1830s, the mayor of New York City issued quarantine for all ships and vehicles entering the city in an attempt to protect the town from a cholera pandemic. During the Spanish flu of 1918 (the deadliest pandemic in history), health authorities in the U.S. and Europe recommended social isolation because they knew the flu-causing pathogen was spread through the air by coughing and sneezing. As such, several agencies banned public gatherings and closed public institutions. Outbreaks of cholera from passenger ships arriving from Europe prompted a reinterpretation of the law in 1892 to provide the federal government more authority in imposing quarantine requirements. The quarantine system was fully nationalised by 1921 when the administration of the last quarantine station was transferred to the U.S. government. By 1995, all U.S. ports of entry were covered by only seven quarantine stations. A station was added in 1996 in Atlanta, Georgia, just before the city hosted the 1996 Summer Olympic Games. Following the severe acute respiratory syndrome (SARS) epidemic of 2003, CDC reorganised the quarantine station system, expanding to 18 stations with more than 90 field employees. Further, isolation also explained, given COVID19. A separation is a person who has got the disease, and under medical care, it means he/she is sick.

6. ISOLATION:

Isolation refers to separating sick people with a contagious disease from those who are not ill. Hospitals use isolation for patients who have a known infectious disease that can be spread easily to others. A person, who finds themselves ill with COVID-19, needs to isolate themselves in a specific room away from other household members. Household members should use a separate bedroom and even a separate bathroom if possible. It is also recommended that the ill person should eat or be fed in their room away from other household members. Household items such as dishes, drinking glasses, cups, eating utensils, towels, bedding, or other items should not be shared with the person infected with COVID-19. It is vital to prohibit all visitors and non-essential people from being in the home.

6.1. HYGIENE PROMOTION:

Avoid large gathering and prioritise house to house visit with sufficient distance between the hygiene promoter and the household. Focus on mass media (radio, SMS, digital, megaphone, church & mosque announcements, etc.) but also the use of loudspeakers in specific neighbourhood and camp settings. Increase water quantity delivered to allow frequent hand washing practices as well as regular cleaning and disinfection. Increase water storage capacity to limit water collection requirements. Ensure hand washing facilities available at the entrance of the camp and make hand washing mandatory for anyone entering. Set up a queuing system to allow physical distancing.

6.2. Critical Elements of HH:

For effective hand hygiene, all staff in healthcare facilities (HCF) must wash or disinfect their hands at five critical moments: before patient contact, before an aseptic task, after body fluid exposure risk, after patient contact, and

after contact with patient surroundings. Sanitary gloves and other prophylactic materials must be kept in continuous supply, worn during patient interactions, and safely discarded to reduce the spread of germs. Healthcare staff should also wash their hands when entering or exiting HCFs, before eating, and after using the toilet, and should encourage patients and visitors to do the same WHO(2015).

6.3. RECOMMENDATIONS:

Improving hand hygiene in HCFs requires sustained action on multiple levels to improve knowledge, competencies, and motivation; supplies and infrastructure; and the enabling policy environment. Frequent and proper hand hygiene is one of the most important measures to prevent infection with the COVID-19 virus. Safe hygiene measures will protect from transmission of the virus from infected individuals and contaminated surfaces. All health care facilities should have regular programmes aimed at promoting best hand hygiene practices and ensuring the availability of the necessary infrastructure (equipment and supplies). Many co-benefits will be realised by safely managing water and sanitation services and applying good hygiene practices. Such efforts will prevent many other infectious diseases, which cause millions of deaths each year and will enable health care facilities to provide safe, quality care WHO(2020).

7. CONCLUSION:

To avoid any outbreaks of epidemic or pandemic to spread of pathogens in healthcare, basic requirement is water. On the globe nearly 785 million people lack access to clean water. On average, 61 per cent of healthcare workers are not adhering to best hand washing practices and antimicrobial resistance leads to 7,00,000 deaths every year. Each year 1.7 million children die from diarrhea and pneumonia diseases. Currently, 600 million Indians face high to extreme water stress and about two lakh people die every year due to inadequate access to safe water Lal(2019). These are the critical issues before practicing hand wash, unless we couldn't answer or provide proper solution hand washing slogan remains un-useful. Therefore water is very important in day-to-day life for sustainable and it should be a human right.

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