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## Preventive Management of Covid 19 Using Soap and Hand Sanitizer -A Review.

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**Abstract:** Handwashing is thought to be effective for the prevention of transmission of infectious pathogens. Scientific studies have shown that after hand washing 80 % of individuals retain some pathogenic bacteria on their hands. The purpose of handwashing is to remove potentially harmful organisms from hands preventing the transmission from person to person. Handwashing with non-antibacterial soap and sanitizer was more effective for the removal of bacteria in the prevention of transmission of infectious diseases. Effective handwashing with soap requires reliable access to the quality of water used. The antimicrobial antibacterial, antiviral efficacy of alcohol-based hand sanitizers and soap were compared. The use of soaps for hand hygiene appeared to be less efficacious against Gram-negative organisms. The comparative study addresses the feasibility and health impacts of promoting hand sanitizer as an alternative hand hygiene option for which water-constrained environments should be assessed. However, both hand sanitizers and soaps can be used as effective measures to control the spread of diseases.

**Keywords:** Hand washing; Sanitizer; Soap; Bacteria.

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### INTRODUCTION

Hand hygiene is associated with disease prevention and health promotion, and the importance of hygiene is universally recognized and evidence-based (Erasmus *et al.*, 2010),(Mp, Brundha and Nallaswamy, 2019). The spreading of germs can be prevented by effective hand washing practices. Germs are microorganisms such as bacteria and viruses that may lead to harmful diseases. Physical contact between people and objects is a key vehicle for the transmission of pathogens(Aiello *et al.*, 2008). Therefore, effective hand hygiene is a way to prevent diseases. Decontamination of hands can be carried out either by handwashing with soap or by the use of waterless hand sanitizers, in situ(Ansari *et al.*, 1988),(Brundha, Pathmashri and Sundari, 2019). The effect of hand hygiene in reducing infectious disease could be increased to apply hand hygiene procedures correctly (eg, wash their hands correctly) and at the correct time (Luby *et al.*, 2011).To optimize health benefits, CDC recommends after washing hands with soap and water, the hands should be dry because wet hands spread germs more than dry ones(Timothy, Samyuktha and Brundha, 2019).Our team has rich experience in research and we have collaborated with numerous authors over various topics in the past decade (Deogade, Gupta and Ariga, 2018; Ezhilarasan, 2018; Ezhilarasan, Sokal and Najimi, 2018; Jeevanandan and Govindaraju, 2018; J *et al.*, 2018; Menon *et al.*, 2018; Prabakar *et al.*, 2018; Rajeshkumar *et al.*, 2018, 2019; Vishnu Prasad *et al.*, 2018; Wahab *et al.*, 2018; Dua *et al.*, 2019; Duraisamy *et al.*, 2019; Ezhilarasan, Apoorva and Ashok Vardhan, 2019; Gheena and Ezhilarasan, 2019; Malli Sureshbabu *et al.*, 2019; Mehta *et al.*, 2019; Panchal, Jeevanandan and Subramanian, 2019; Rajendran *et al.*, 2019; Ramakrishnan, Dhanalakshmi and Subramanian, 2019; Sharma *et al.*, 2019; Varghese, Ramesh and Veeraiyan, 2019; Gomathi *et al.*, 2020; Samuel, Acharya and Rao, 2020)In this study comparative analysis of handwashing with soap and hand sanitizer was discussed.

### Mechanism of soap

Soap works by breaking up the oil into smaller drops, so it can mix with the water. Soap molecules are a type of surfactant, which means hydrophilic, and hydrophobic end (Shenoy, 2016). Soap molecules act as a mediator between oil and water molecules and bind with both of them at the same time. Then when you rinse everything off, the soap carries away the germs with the water(Langley, 2002).

### **Mechanism of hand sanitizer**

It works by killing microbial cells. It contains 70 % isopropyl alcohol, which is rubbing alcohol. That's the concentration of rubbing alcohol that is most effective in killing germs(Harsha and Brundha, 2017). Because it has a little bit of water in it, it improves penetration. For virus -sanitizer works by disrupting the virus's outer coat. For bacteria - it works by disrupting its cell membrane (Rai *et al.*, 2017).

### **Efficacy - Soap and Hand Sanitizer**

#### **Soap**

The non-antibacterial soap is much more effective in removing bacteria from hands than hand washing with water only(Boyce, 2001), (Brundha, 2015). Studies of the efficacy of hand hygiene agents have shown that antiseptic agents (antimicrobial soaps or waterless antiseptic hand rubs) are significantly more effective in reducing microbial counts on the skin than plain soap and water hand washing in reducing skin flora(Pittet and Boyce, 2001),(Selwyn, 1982).

#### **Hand sanitizer**

The advantage of using alcohol-based hand sanitizer is often less irritating to the hands. Excessive handwashing with soap and water can cause skin damage and increase the risk for infections(Varshini, Rani and Brundha, 2020), (Greenaway *et al.*, 2018). The CDC recommends the use of alcohol-based hand rubs containing various emollients and other skin conditioners instead of irritating soaps and detergents as a strategy to reduce skin damage, dryness, and irritation(Kumar, Ashok Kumar and Brundha, 2016). Allergic contact dermatitis associated with alcohol-based hand rubs is uncommon(Cure and Van Enk, 2015),(Kalaiselvi and Brundha, 2016). The Draft Guideline for Hand Hygiene in Healthcare Settings concluded that alcohol-based hand rubs are more effective than washing hands with antimicrobial or nonantimicrobial soap.

### **Antibacterial And Antimicrobial Activity - Soap And Hand Sanitizer**

Handwashing with soap was less efficacious against fecal streptococci on hands compared with its efficacy against *E. coli*. Hand sanitizer performed better than handwashing with soap at reducing concentrations of *E. coli* and fecal streptococci on hands(Burton *et al.*, 2011),(Ravichandran and Brundha, 2016).In contrast, hand sanitizer was observed to reduce levels of *E. coli* and levels of fecal streptococci comparably(Prashaanthi and Brundha, 2018). Enterococcus is a Gram-positive bacterium, and *E. coli* is a Gram-negative bacterium. Enwa Felix O et al revealed that *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Streptococcus* species, and *Shigella* species are present in the hands of humans. The result also revealed better efficacy of the alcohol-based hand sanitizers in comparison to the soaps because all four bacterial isolates were susceptible to hand sanitizers and soaps had no effect against Gram-negative *Shigella* species which makes them less efficacious(Sardar, 2017),(Preethikaa and Brundha, 2018).

### **Antiviral Property**

Alcohol-based hand sanitizers are an effective deterrent to the transmission of enveloped viruses such as influenza virus, hepatitis B virus, and herpes simplex viruses 1 and 2 (Kampf and Kramer, 2004), (Ferdioz and Brundha,2016 ) But they are less effective for controlling the transmission of human enteric viruses, particularly the epidemiologically important Human norovirus group. The alcohol-based hand sanitizers are relatively ineffective against Norovirus (Fankhauser *et al.*, 2002). Even though water washing, with or without the addition of antibacterial soap, can remove some NV from fingers(Atmar *et al.*, 2008)

### **Contraindications**

#### **Hand sanitizer**

Alcohol containing hand sanitizer has very poor activity against protozoan oocysts, certain non-enveloped (non-lipophilic) viruses, and bacterial spores(Hannah *et al.*, 2019). Alcohol gel kills the vegetative cell form of *Clostridium difficile* but does not kill *C. difficile* spores(Takahashi *et al.*, 2018). Several studies have found handwashing with soap and water to be more effective at removing *C. difficile* spores than ABHS. Interestingly, a study of farmworkers demonstrated that those who used hand sanitizer were found to have elevated concentrations of urinary pesticide metabolites(Knighton *et al.*, 2017). The efficacy of alcohol-based hand sanitizer is affected by several factors such as the type, concentration, and volume of alcohol used, the contact time, (CDC, 2002), the test method (in vivo and in vitro), target organisms and matrix(Liu *et al.*, 2010).

#### **Soap**

Scientists have also found that antibacterial soap weakens the human immune system and kills beneficial bacteria that live on the skin's surface since triclosan indiscriminately kills bacteria(Levy, 2001). The issue of antimicrobial resistance has led many scientists to encourage the shift from antibacterial to plain soap which can be as effective in cleaning hands without exacerbating the issue of resistance(Shreya and Brundha,

2017),(Balaji, Brundha and Path, 2016). Although soap has led to vast improvements in quality of life since its invention in ancient Babylonian times due to its cleansing and surfactant properties, the widespread use of soap cause negative health effects and environmental damage caused by triclosan, a prevalent ingredient in antibacterial soap, and the rise of antibiotic resistance, a serious issue facing modern healthcare(Larson, 2001),[37].Our institution is passionate about high quality evidence based research and has excelled in various fields ( (Pc, Marimuthu and Devadoss, 2018; Ramesh *et al.*, 2018; Vijayashree Priyadharsini, Smiline Girija and Paramasivam, 2018; Ezhilarasan, Apoorva and Ashok Vardhan, 2019; Ramadurai *et al.*, 2019; Sridharan *et al.*, 2019; Vijayashree Priyadharsini, 2019; Chandrasekar *et al.*, 2020; Mathew *et al.*, 2020; R *et al.*, 2020; Samuel, 2021)

## CONCLUSION

The outbreak of epidemic infections such as Ebola hemorrhagic fever HIV, Diarrhea, Coronavirus, etc., are highly infectious and can be easily transmitted through infected hands. Hand sanitizer kills viruses and certain bacteria does not remove actual dirt and debris. Soap kills germs, binds them, and helps physically remove them with water, of your skin, and down the drain. The use of soap and water for hand hygiene can be effective if there is the availability of clean water. Hand sanitizers are preferable because they have rinsed free, do not require water. However, when hands are dirty, hand sanitizers are not as effective as soap for cleaning. Finally, this study shows soap and water is an effective method of removing harmful microorganisms than hand sanitizer. However, hand hygiene is essential for good health benefits for social and economic developmental purposes.

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