



Role of Alcohol Based Hand Rubs (ABHR) in the Covid-19 Era: A Concise Review

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ABSTRACT

In this current pandemic of COVID-19, entire world is facing a huge crisis in healthcare and economic fronts. Till date, there is no definitive drug or vaccine for the cure of this novel Coronavirus 2019. Numerous repurposed and newer drugs are being tried in the therapy of this disease yet none have reached to conclusion of effectiveness in this disease. Hence, preventive strategies like social distancing, hand washing, using hand sanitizers, masks and personal protective equipment tends to be the crucial component in prevention from getting infected from this highly infective virus. Alcohol based hand sanitizers and hand rubs with more than 70 % alcohol seems to be effective in disinfecting the hands and touched surfaces. The sanitizers seem to be the first line of defense in the prevention of COVID19 as well as other microbial infections. The article elaborates the importance of hand sanitizers in the present new world pandemic and reduction in disease burden.

Keywords: COVID-19; Coronavirus; Hand sanitizer; Alcohol Base Hand Rub; Micro-organism; SARS-CoV-2.

INTRODUCTION

The current pandemic of Coronavirus Disease 2019 (COVID-19) has been found to cause by a novel Coronavirus severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).¹ The deadly virus starts with respiratory infection which may range from asymptomatic cases to pneumonia and can also worsen to a scenario of multi organ failure.¹ It started with few cases of pneumonia of unknown etiology and initially reported in Wuhan district of China in December 2019.² Later it got spread all over the globe affecting majority of the continents becoming a menace to international public health following which World Health Organization (WHO) officially declared this ongoing outbreak as pandemic on March 11th, 2020.³ By 2nd Aug 2020, total worldwide cases of COVID-19 as reported by WHO was about 17,918,582 with, 686,703 deaths.⁴ In India cases of coronavirus are 18,58,689 with 25,602 deaths⁴ with Maharashtra state being worst affected.⁵

The disease transmission of SARS-CoV-2 is by inhalation or contact with infected droplets, cough, contaminated hands/surfaces, fomites etc.⁶ Till now no specific treatment or vaccine is available for the treatment of this infection hence, only supportive and symptomatic treatment is usually suggested in most of the cases.⁷ In view of such scenario, looking at havoc that SARS-CoV-2 has caused globally, WHO and Center for Disease Control and Prevention (CDC) have emphasized on preventive measures like adherence to strict hand hygiene practices, social distancing and use of personal protective equipment.⁸

Hand Hygiene in Infection Control

Maintenance of hand hygiene is deemed as cornerstone of infection prevention and control in health care settings as well as in the community. It is essential in reducing colonization and transmission of infection among individuals. Many studies have suggested direct link between lack of hand hygiene with enteric, respiratory and skin infections.⁹ Awareness on standard precautions among general population, especially hand hygiene either by cleaning hands with a household soap and water or with an alcohol-based hand rub (ABHR) need to be emphasized.¹⁰

To reduce infections in healthcare settings as well as in community, alcohol-based hand rub is recommended as an important component of hand hygiene.¹¹ For alcohol-based hand rub, Food and Drug Administration (FDA) recommends a concentration of 60% to 95% ethanol or isopropanol.¹² A survey report by WHO suggests that improving hand hygiene practices may reduce pathogen transmission by 50%.¹³

Hand Sanitizers and Implications

A hand sanitizer is a liquid/gel/foam formulation generally used to decrease infectious agent on hands. Used most commonly in health care settings. There are two types of hand sanitizers: (1) Non-Alcohol-Based Hand Sanitizers (NABHS) and (2) Alcohol-Based Hand Sanitizers (ABHS)¹⁴ (Table-1). The principle component of non-alcohol based hand sanitizer is a quaternary ammonium compound namely benzalkonium chloride which is considered as a low level disinfectant and is less effective as compared to alcohol based hand rubs which are active on wide range of



micro-organisms.¹⁵ Although there are few advantages of using quaternary ammonium compound like less skin irritability, non-inflammable nature and no abuse potential

however major drawback is its low efficacy and the narrow spectrum of action as compared to alcohol based hand rubs.¹⁶

Table 1: Various Alcohol based hand rub (ABHR) available in market¹⁴

S.No.	Brand	Country of Origin	Component
1.	Purell	U.S.A.	Ethyl alcohol 70% v/v, Water (Aqua), Isopropyl Alcohol, PEG-12 Dimethicone, Caprylyl Glycol, Glycerin, Isopropyl Myristate, Tocopheryl Acetate, Fragrance (Parfum)
2.	Dettol	U.K., China	Denatured Alcohol - 69.4%w/w, Water PEG/PPG17/6 copolymer, Propylene glycol, Acrylate /C10-30 alkyl acrylate, cross polymer, Tetrahydropropyl ethylenediamine, Perfume
3.	Lifebuoy	India	Ethyl alcohol 95%, Isopropyl alcohol 10%, tocopheryl acetate 0.05%perfumed gel base 100%
4.	Himalaya	India	Dhanyaka 0.30 mg, Ushira 0.30, Nagaramusta 0.25 mg, Shati 0.10 mg, Nimba 0.05 mg
5.	Godrej	India	Ethyl Alcohol 95% (v/v) I.P. (Denatured with Isopropyl Alcohol 3% (w/w)) 64% (w/w), Water, Glycerin, Acrylates/C10-30 Alkyl Acrylate Crosspolymer, Triethanolamine, Perfume.
6.	Zuci	U.S.A.	Strawberry extract, Salicylic acid, Vitamin E
7.	Sterillium	India	Propan-2-ol, Propan-1-ol, Mecetronium ethyl sulfate, glycerol, Tetradecane-1-ol, Fragrances, Patent blue V, purified water.
8.	3M	U.S.A.	Chlorhexidine Gluconate 0.5% w/v and Ethyl Alcohol IP 70% v/v
9.	Savlon	India	Ethanol IP 66.5% V/V, Isopropyl Alcohol I.P 3.5% V/V, Permitted Colours Used, Gel-Based Q.S.
10.	Germ-X	U.S.A.	Aloe Barbadosensis Gel, Carbomer, FD&C Blue No. 1, FD&C Yellow No. 5, Fragrance, Glycerin, Isopropyl Alcohol, Isopropyl Myristate, Propylene Glycol, Tocopheryl Acetate, Water
11.	Mountain fall	U.S.A.	Ethyl alcohol 75%, Water, Glyceryl caprylate, Isopropyl myristate, Tocopheryl acetate, Acrylates/C10-30 alkyl acrylate cross polymer, fragrance, benzophenone-4

Time and again, studies have shown the effectiveness of hand hygiene in prevention of infection.¹⁷ Although some studies suggests that hand washing with soap and water is considered superior than hand sanitizer.¹⁷ But use of hand sanitizer has gained popularity due to their ease of availability, no need for water or plumbing, and their proven effectiveness in reducing microbial load.

EVIDENCES: AS THEY REPORT

In one of a hospital-wide study, hand hygiene campaign with special emphasis on a bedside, alcohol-based hand disinfection resulted in sustained improvement in hand-hygiene compliance, coinciding with a reduction of nosocomial infections and MRSA transmission.¹⁸ The promotion of the bedside, antiseptic, hand rubs largely contributed to the increase in compliance. Many other studies have demonstrated that having bedside alcohol-based solutions available increased compliance with hand hygiene among health care workers (HCWs).¹⁹ However, there are several other factors that are to be kept in consideration like alcohol hand sanitizer's efficacy is dependent upon which and how much product is used, use of proper technique, and consistency of use. Some data also show that hand sanitizers may work well against certain types of germs on slightly soiled hands.^{17,20} However, hands

may become very greasy or soiled in community settings, such as after playing sports, working in the garden etc. When hands are heavily soiled or greasy, hand sanitizers may not work well.^{17,21,22} Hand washing with soap and water is recommended in such circumstances. Many studies show that hand sanitizers work well in clinical settings like hospitals, where hands come into contact with germs but generally are not heavily soiled or greasy.²²

A systematic review on the effectiveness of alcohol-based solutions for hand hygiene by Wilawan Picheansathian et al. included thirty seven studies that support the use of alcohol based solutions for routine hand hygiene and surgical hand scrub.²³ Alcohol-based hand rub removes microorganisms from hands of personnel more effectively, requires less time, and irritates hands less often than traditional hand washing with non-medicated soap or other antiseptic agents and water. The combination of 61% ethanol and 1% chlorhexidine gluconate (CHG) is even more effective in producing residual antibacterial properties on the skin.²³ Also the availability of bedside alcohol based solutions increased compliance with hand hygiene among HCWs.²³

In 2002, a guideline for hand hygiene in health-care settings was published by a Hand Hygiene Task Force, comprising representatives from the Healthcare Infection Control

Practices Advisory Committee (HICPAC), the Society for Healthcare Epidemiology of America (SHEA), the Association for Professionals in Infection Control (APIC), and the Infectious Diseases Society of America (IDSA) which provided a more detailed discussion of alcohol-based hand rubs and supported their use in clinical settings.⁶ A study done by Tamami et al. on impact of the use of an ABHS in the home on reduction in probability of infection by respiratory and enteric viruses, founded that the risk of Rhinovirus, Rotavirus or Nora virus infection after the intervention was reduced by 47-98% depending upon the initial concentration of virus on the hands.²⁴

Although it is well established fact that alcohol-based hand rubs are far more effective than non- alcoholic hand rubs in prevention of infectious disease transmission. It is important to be precautious while using ABHR due to its inflammable nature, potential for abuse and its frequent may cause skin irritation as the oil secreted from the sebaceous gland of the skin surface possess antiviral activity.²⁵ Due to frequent use of alcohol-based hand sanitizers these oils may be washed out from the skin surface and may lead to skin dryness and irritability which favors microbial invasion in deeper layer of skin and thus promote microbial infection.

CONCLUSION

In this COVID-19 era, when we are still in search for appropriate treatment for the infection, Research and Development wing of all major pharmaceutical companies are busy exploring treatment options and vaccine development. Preventive measures needs to be followed strictly to prevent transmission of infection. Enough evidence have suggested that use of ABHR is an efficient step in breaking the chain of transmission along with social distancing and use of personal protective equipment.

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