Bulletin of Pure and Applied Sciences
Vol.39A (Zoology), No.1,
January-June 2020: P.242-245
Short communication

Print version ISSN 0970 0765
Online version ISSN 2320 3188
DOI 10.5958/2320-3188.2020.00027.3
Available online at www.bpasjournals.com

Effectiveness of Hand wash and Sanitizer: COVID19

[1]Vijay Mohan Soni
[2]Shiv Singh
[3]Neha Munjal*
[4]Sanjay Kataria

Author's Affiliation:
[1,3]Lovely Professional University, Phagwara, Punjab144411, India
[2,4]Bennett University, Noida, Uttar Pradesh 201310, India

***Corresponding author:**
Neha Munjal
School of chemical engineering and Physical sciences, Lovely Professional University, Phagwara, Punjab144411, India

E-mail:
neha.18869@lpu.co.in

Received on 11.03.2020
Accepted on 21.05.2020

Abstract:
The latest threat to global health is the on-going epidemic COVID-19. It has shaken the whole world tremendously in the past few months; it posed critical challenges for the public health, research and medical communities. Till now, there is no antidote to it, only possible solution is precaution, maintaining hygiene. Hand hygiene is of prime importance. Thus, in this article an attempt has been made to promote that hand washing is the best suitable method over hand sanitizer because excessive use of hand sanitizer can lead to the new threat in imminent future.

Keywords:COVID19, Hand Hygiene, Sanitizers

INTRODUCTION

Coronavirus disease 2019 (COVID-19) was recognized in December 2019, when the transmission of massive infection spreads by human to human. It has taken place in the matter of weeks in Wuhan, China. It had been thought that nCoV19 is introduced to humans from the animal kingdom in November 2019 in China. Since then, it has become a threat to global health. This epidemic has posed life threatening challenges for the research, public health and medical communities. As, per the WHO report dated 16thMay 2020, 4, 347, 935cases of COVID-19 infected people have been confirmed from 216 regions/countries and 297, 241deaths. Till now, there are no licensed vaccines or coronavirus antivirals therapy. The only solution is to follow the protective measures such as washing the hands frequently, maintaining the social distance, avoid touching eyes, nose and mouth, practicing respiratory hygiene, intake of vitamin C, sipping hot water, exposing towards direct sunlight, wearing clean clothes etc.[1]

Among these the elementary protective measure is Hand Hygiene. Good hand hygiene is recognized as a simple but powerful technique for preventing transmissions of the infections. The promotional campaign has intensively promoted the use of sanitizer; the present scenario is that there is a shortage of sanitizer globally. The hand hygiene can be maintained equally well with soap washing for the common man as preventive measure since the excessive use of sanitizer can bring new threat in an imminent future[2].

HAND WASH VERSUSSANITIZER

There is matter of deliberation between the effectiveness of hand wash and sanitizer. The main purpose of the hand wash is to remove germs/bacteria/pesticides/metal ions[2]. When hands are washed with soap the dirt and germs which are trapped in the natural oils of the skin are lifted up

and adjourned in the water. Thus, washing hands with soap don't kill germs but they remove them from hands with the aid of running water[3]. Whereas sanitizers are only effective when hands are scrub properly for 20 seconds thoroughly[4].

Hand sanitizer is considered the best alternative to cleaning hands with soap and water. It is a simple, quick, convenient and portable method to disinfect our hands when there is no running water available around us. There are usually two types of sanitizers: alcohol and non-alcohol based. In non-alcoholic sanitizer, benzalkonium chloride is the active compound, which is non-flammable and non-toxic. It is easier on hands as well as provides protection against germs. Also, non-alcoholic sanitizer possesses low threat when accidentally ingested or comes in contact with fire. However, studies suggest that these sanitizers are less effective in preventing the transmission of pathogens. On the other hand, alcohol-based sanitizer is widely used by people and healthcare workers. It contains alcoholic ingredients such as isopropanol, n-propanol, ethanol or the combination of any two of them. Usually, it is made of 60-85 per cent ethanol due to its strong antimicrobial activity. According to a study, the use of hand sanitizer reduces colonisation and hand infection, specifically in healthcare workers. It decreases the transmission of infections to patients, ultimately reducing their mortality rate. There are the studies, which reports that every year hand sanitizers reduce the transmission of pathogens in around 1.4 million patients worldwide[5,6].

Sanitizer is the water less solution for cleaning the hands. They have a numerous benefits over hand washing with soap and water such as requires less time, act quickly to kill microorganism/viruses/bacteria on hands, do not promote antimicrobial resistance etc[7,8]. The use of sanitizer is effective only when it is being applied properly on the hands, the same steps are to be followed as for washing the hands but the layman is using only on palms[4]. However, they are not effective if organic matter (dirt, food, or other material) is visible on hands. Further, alcohol based hand sanitizer kills the bacteria by softening of bacterial membrane, which can lead to the penetration of the organic compounds into cytoplasmic membrane resulting in swelling and increase of membrane fluidity. This upsurge can lead to the loss of membrane functionality and to the damage of bacterial cell[5,7]. Further, it is not effective in killing all types of germs such as stomach bug known as norovirus[9], some parasites and Clostridium difficile, which can cause severe diarrhea. They are not effective in removing harmful chemicals such as pesticides and heavy metals such as lead. Its, worth to mention that the one of the main aspect of hand sanitizers that is generally overlooked is that they can affect bodies microbiome by altering the communities of beneficial bacteria on the skin. Not only this, the excessive use can affect the antibiotic resistance. Most of the hand sanitizer contains a high volume of ethanol or ethyl alcohol for protection against different kinds of microbes[9]. Ethyl alcohol is a kind of colourless flammable liquid that gives a pungent smell to hand sanitizers. At room temperature, it readily evaporates into an ignitable vapour and catches fire easily if accidentally comes in contact with heat[7,10].

As per the study reported by Liu et al.[11] the 30-days continuous exposure of hand sanitizer can develop resistance against bacteria. They further possess negative effects on the skin which can cause burning sensation and itching of skin. Excessive use of it can dry out the upper layer of the skin, causing it to peel. The other adverse effects of sanitizers (alcohol based or non-alcohol based) are mainly seen in the younger kids such as ocular irritation, vomiting, conjunctivitis, oral irritation, cough, and abdominal pain. Further, few rare effects are there if younger kids swallow it such as coma, seizure, hypoglycemia, metabolic acidosis, and respiratory depression[12]. These dangers are also reported by the Food and Drug Administration's (FDA)[13].

Sanitizers are the best alternative to soap and water under the conditions where the hand washing with soap is not feasible[14-16]. They are best suitable for healthcare professionals as they often perform duties in sterile settings and are required to clean their hands constantly throughout day[17]. The healthcare workers are also encouraged to wash their hands in between while using the sanitizers.

SUMMARY

Thus, practice of Hand washing for 20 seconds should be recommended for the layman instead of the alcohol based sanitizer to prevent the threat of COVID-19. In case hand washing is not available then Sanitizer that contains at least 60% alcohol can be used. The health professionals should advice the layman, when to clean the hands and by which method they can keep away from several diseases. The excessive use of sanitizers by layman/general population can bring the new threat to the society in coming time, the primarily is antibiotic resistance and skin disorders. It also suggests that antibacterial hand gels might exacerbate skin conditions characterized by excessive inflammation. The most common family of bacteria found on the skin is Staphylococcus, the membranes of which are harmless, unless they get into wounds.

Although, hand sanitizers are effective disinfectants and are easy to use, but these products also have potential harm. Hence forth, the promotional campaign should focus more on hand wash technique instead of sanitizers for general population to fight with the emerging and remerging pathogens of outbreak COVID-19.

REFERENCES

1. https://www.who.int/emergencies/diseases/novel-coronavirus-2019 (Accessed on 15thMay 2020)
2. Edmonds, S.L., Mann, J., McCormack, R.R., Macinga, D.R., Fricker, C.M., Arbogast, J.W. and Dolan, M.J. SaniTwice: a novel approach to hand hygiene for reducing bacterial contamination on hands when soap and water are unavailable. Journal of food protection. 2010; 73(12):2296-2300.
3. Pickering AJ, Davis J, Boehm AB. Efficacy of alcohol-based hand sanitizer on hands soiled with dirtand cooking oil.external iconJ Water Health. 2011 Sep;9(3):429-33.
4. Kampf, G., Reichel, M., Feil, Y., Eggerstedt, S. and Kaulfers, P.M. Influence of rub-in technique on required application time and hand coverage in hygienic hand disinfection. BMC infectious diseases. 2008; 8(1): 149.
5. Gold, N.A. and Avva, U. Alcohol Sanitizer. In StatPearls [Internet]. StatPearls Publishing. 2018.
6. Kramer, A., Galabov, A.S., Sattar, S.A., Döhner, L., Pivert, A., Payan, C., Wolff, M.H., Yilmaz, A. and Steinmann, J. Virucidal activity of a new hand disinfectant with reduced ethanol content: comparison with other alcohol-based formulations. Journal of Hospital Infection. 2006; 62(1):98-106.
7. Rotter, M.L. Arguments for alcoholic hand disinfection. Journal of Hospital Infection. 2001; 48: S4-S8.
8. Greenaway, R.E., Ormandy, K., Fellows, C. and Hollowood, T. Impact of hand sanitizer format (gel/foam/liquid) and dose amount on its sensory properties and acceptability for improving hand hygiene compliance. Journal of Hospital Infection. 2018; 100(2): 195-201.
9. Blaney DD, Daly ER, Kirkland KB, Tongren JE, Kelso PT, Talbot EA. Use of alcohol-based handsanitizers as a risk factor for norovirus outbreaks in long-term care facilities in northern New England: December 2006 to March 2007.external icon Am J Infect Control. 2011 May; 39(4):296-301.
10. Rayar, P. and Ratnapalan, S. Pediatric ingestions of house hold products containing ethanol: a review. Clinical paediatrics. 2013; 52(3): 203-209.
11. Lu, J., Jin, M., Nguyen, S. H., Mao, L., Li, J., Coin, L. J. M., Guo, J. (2018). Non-antibiotic antimicrobial triclosan induces multiple antibiotic resistances through genetic mutation. Environment International, *118, 257–265.* doi:10.1016/j.envint.2018.06.004
12. Loren Bonner, CDC report calls attention to hand sanitizer risk in children, Pharmacy Today May 2017
13. Todd, E.C., Greig, J.D., Michaels, B.S., Bartleson, C.A., Smith, D. and Holah, J. Outbreaks where food workers have been implicated in the spread of foodborne disease. Part 11. Use of antiseptics and sanitizers in community settings and issues of hand hygiene compliance in health care and food industries. Journal of food protection. 2010;73(12): 2306-2320.

14. Grayson, M.L., Melvani, S., Druce, J., Barr, I.G., Ballard, S.A., Johnson, P.D., Mastorakos, T. and Birch, C. Efficacy of soap and water and alcohol-based hand-rub preparations against live H1N1 influenza virus on the hands of human volunteers. Clinical Infectious Diseases. 2009; 48(3):285-291.
15. https://www.cdc.gov/handwashing/show-me-the-science-hand-sanitizer.html (accessed 31st March 2020)
16. Kampf, G. and Kramer, A. Epidemiologic background of hand hygiene and evaluation of the most important agents for scrubs and rubs. Clinical microbiology reviews. 2004; 17(4): 863-893.
17. Jessica Hilburn, Brian S. Hammond, Eleanor J. Fendler, Patricia A. Groziak, Use of alcohol hand sanitizer as an infection control strategy in an acute care facility, AJJC, 31(2), 109-116.