

Original Research Article

Effect of frequent hand washing for COVID-19 prevention

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ABSTRACT

Background: Coronavirus disease 2019 (COVID-19) has become a global public health concern. While dealing with COVID-19 pandemic, hand washing and the use of hand-hygiene products has been advocated, as a preventive measure. However, frequent hand washing leads to an increased risk of skin changes ranging from dryness and peeling of skin to itching, redness and blister formation. This study aims to understand the hand-hygiene practices and compare side effects between group using hand sanitizers with the group using soap with water.

Methods: A 12-item self-administered close ended questionnaire assessing the hand washing habits and effect of the same on skin was used. A total of 60 cases were enrolled. The correlation between use of hand hygiene measures and the clinical changes was studied.

Results: In our study, 32 out of the 60 reported a frequency of hand washing between 5-10 times a day. The awareness about using hand moisturizer was noted in 75% individuals. Side effects were more commonly observed in group B using alcohol-based sanitizers as compared to group A using soap with water. Dryness was the most common symptom, observed in 23.3% individuals using alcohol-based sanitizers and 10% individuals using soap with water.

Conclusions: Hand-hygiene measures remain the cornerstone of prevention of COVID-19 transmission. However, the use of hand-hygiene products is associated with side effects especially dryness. Regular use of hand moisturizer is essential in preventing the unnecessary effects of frequent hand washing.

Keywords: COVID-19, Hand washing, Sanitizer, Side-effects, Soap

INTRODUCTION

Coronavirus disease 2019, better known as COVID-19, is an acute respiratory infection caused by the novel coronavirus severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The outbreak of this infection originated from Wuhan, China in late 2019 and rapidly spread throughout the world.¹ The World Health Organization (WHO) declared COVID-19 outbreak as a global pandemic in March 2020 and urged the countries to take measures to reduce transmission.² Vaccines against COVID-19 are not available and the process of developing vaccine has been initiated by many countries worldwide.^{3,4}

Among the public health measures to curb the transmission, proper hand washing has been strongly recommended by WHO. While it is a necessary prevention measure, the increased frequency of hand washing and use of hand sanitizers has negative effect on the skin barrier leading to an increased incidence of skin changes. Adverse dermatologic effects, such as excessive skin dryness or even contact dermatitis (particularly the irritant subtype and, to a lesser extent, the allergic subtype), can occur, especially in individuals with a history of atopic dermatitis.

These skin conditions can however be tackled by simple measures. Applying a moisturizer immediately after washing hands with soap or hand sanitizer can reduce the development of the side-effects on hands.

This study was conducted with the aim to study the knowledge and practice of hand-hygiene habits as well as to study the adverse effects of frequent hand washing with alcohol-based sanitizers and soap-water.

METHODS

A cross-sectional questionnaire-based study was conducted by the Department of dermatology at UPUMS, Saifai, Uttar Pradesh. The study was conducted from April 2020 to July 2020, after taking ethical clearance from the institutional review committee. Given the social distancing measures along with restricted movement and lockdowns, the data was collected using Google form platform as an online survey. The link of Google form was posted and circulated using various social media platforms like Whatsapp group and e-mail address to the residents of Saifai. The participants were informed the details of the study objectives for filling the questionnaire and about confidentiality at the beginning of the questionnaire. Online informed consent was obtained before proceeding with the questionnaire. It was disclosed to the participants that the results will only be used for research purposes. The inclusion criteria comprised of participants of both sexes, aged 18 or above using either soap with water or alcohol-based sanitizer and willing to participate in the study. Participants with incomplete responses, using both soap as well as sanitizer were excluded from the study. Responses obtained were distributed into group a using soap with water and group b using alcohol-based hand sanitizer. 30 completed responses for each group were taken in the study, a total of 60 people were enrolled in study.

A 12-item self-administered closed ended online questionnaire was formulated. The first part of questionnaire covered demographic and general health information of participants – age, sex, occupation, personal habits and pre-existing systemic conditions. The second part dealt with the practice of hand-hygiene habits and the associated effects of the same – pre-existing skin condition, frequency of hand-washing, use of soap or sanitizer, use of moisturizer and skin changes observed due to frequent hand washing. The data was entered into Microsoft excel 2016. Categorical data were expressed as frequency and percentage. Frequency and descriptive analysis were done by using statistical package for social sciences (SPSS) software (v.21.0).

RESULTS

A total of 60 patients were enrolled in the study. Group A included individuals using soap for hand wash and group B included those using alcohol-based sanitizer. Majority of the patients were males and belonged to the age group

of 20-40 years of age. Higher number of patients were healthcare workers with 9 and 21 patients in group A and B, respectively (Table 1).

Table 1: Demographic distribution of cases.

Demographics	Group A	Group B
Sex		
Male	23	18
Female	07	12
Age (years)		
<20	03	06
20-40	18	19
40-60	07	05
>60	02	00
Profession		
Healthcare workers	09	27
Other	21	03

5 patients in group A had hypertension, the most common systemic comorbidity in group A. In group b, diabetes and hypertension were reported by 7 and 6 patients, respectively (Table 2).

Table 2: Underlying co-morbid conditions in the patients of group A and B, respectively.

Systemic condition	Group A	Group B
Diabetes	02	07
Hypertension	05	06
Thyroid disorder	01	00
Cardiac condition	01	04
Other	04	02

22 and 10 patients in group A and B, respectively, reported a frequency of washing hands daily between 5-10 times a day. 19 patients of group B had a habit of washing hands less than 5 times a day (Table 3). The habit of using a moisturizer on hands was reported by 21 and 24 patients in group A and B, respectively. Pre-existing skin conditions of patients in both groups are tabulated in Table 4. Erosion and dryness were reported by 4 and 3 patients, respectively from group A. Other less common symptoms included itching and redness. 7 and 6 patients, respectively complained of dryness and peeling of skin in group B. Itching, redness, burning sensation and erosions were also reported by a few patients in group B (Table 5).

Table 3: Frequency of daily hand washing among cases.

Frequency (times)	Group A	Group B
<5	05	19
5-10	22	10
>10	03	01

Table 4: Pre-existing dermatoses in patients of group A and B.

Pre-existing dermatoses	Group A	Group B
Contact dermatitis	01	01
Atopic dermatitis	00	00
Psoriasis	01	00
Scabies	01	00
Fungal infection	02	01
Urticaria	02	01
Other	00	00

Table 5: Cutaneous changes observed by the patients in group A and B, respectively.

Cutaneous changes	Group A	Group B
Dryness	03	07
Itching	02	03
Redness	01	02
Peeling of skin	00	06
Vesicles	00	00
Erosion	04	01
Burning sensation	00	02
Pain	00	00



Figure 1: Redness and peeling of skin after hand-sanitizer use.



Figure 2: Dryness and peeling of skin after frequent hand-sanitizer use.



Figure 3: Dryness over dorsum of hands after use of hand-sanitizer.



Figure 4: Aggravation of dryness and itching in 64 year old male patient of contact dermatitis using soap with water.

DISCUSSION

COVID-19 has rampantly spread globally, outpacing the capacity and resources of health systems worldwide. Although a lot of researchers across the world are working on vaccine development, it will take a long time till an effective vaccine is made available to the masses.^{3,4} Many therapeutic trials of drugs like hydroxychloroquine (HCQ), azithromycin, favipiravir and remdesivir have shown promising results.⁵⁻⁷ Based on initial studies, the Indian council of medical research recommended HCQ prophylaxis in certain settings.^{8,9}

A definitive therapy has yet to be established and therefore, the preventive measures are the current approach to control the transmission. As the virus is highly contagious via respiratory route (droplets from infected persons, widely spread by coughing or sneezing) and via contact with contaminated surfaces, transmission in the community can be decreased through the practice of regular and diligent hand hygiene.

However, frequent hand washing causes a prolonged exposure to water and other chemical or physical agents which might induce pathophysiologic changes, such as epidermal barrier disruption, impairment of keratinocyte function leading to release of proinflammatory cytokines, activation of the skin immune system, and delayed-type hypersensitivity reactions. Various changes in skin texture, ranging from the development of cutaneous xerosis (dryness of the skin) up to irritant contact dermatitis (ICD) or, rarely, even allergic contact dermatitis (ACD).

In our study, 61% cases were young adults, belonging to the age group of 20-40 years. About two-thirds of the cases were males. Comorbidities were reported by 13 out of 30 cases in group A using soap and water, with hypertension being the commonest reported by 5 cases. In group B, 19 out of 30 cases had comorbidities with diabetes and hypertension reported by 7 and 6 cases, respectively. Patients with atopic dermatitis are at an increased risk of contact dermatitis because of skin barrier dysfunction. In the study, pre-existing skin conditions were rare with pre-existing contact dermatitis reported by one case in each group. No cases of atopic dermatitis were noted in the study.

WHO suggests alcohol-based hand sanitizer with minimum 60% alcohol as an alternative if soap and water are not available.¹⁰ Infact, the center for disease control and prevention guideline for hand hygiene in health care settings highly recommends use of alcohol-based products for hand hygiene associated to patient care related activities. Among the group using alcohol-based hand-sanitizer, 90% were healthcare workers while only comprising 30% of cases in the group using soap and water. This vast difference can be explained by the availability and convenience of using alcohol-based sanitizer in a hospital setting for the healthcare workers.

Soaps and detergents used for domestic purpose are weak irritants but repeated exposure can cause cumulative ICD, as a result of disruption in the lipids, proteins and epidermal keratin which together form the skin barrier. Some individuals might develop ACD, which is a delayed type hypersensitivity reaction to one or more components of the soap or sanitizer. A study conducted over 10 years involving health workers routinely using alcohol-based hand sanitizer had found allergic reactions to be uncommon.⁹

Frequent use of alcohol-based hand sanitizer can result in dryness and irritation. In our study, cutaneous side-effects as a result of frequent hand washing were reported more commonly by group B using alcohol-based hand sanitizers. Alcohol proportion of the sanitizer tends to evaporate quickly leading to dryness. Dryness and peeling of skin were the commonest complaints with 7 and 6 patients, respectively. 3 patients in group A complained about dryness, while none of the patients reported about

peeling of skin following the frequent use of soap and water.

Redness and itching following frequent use of soap was reported by 1 and 2 cases, respectively. Similarly, 2 and 3 cases of the group B reported redness and itching, respectively. 4 cases had erosions due to frequent use of soap and water, while only 1 person using alcohol-based hand sanitizers reported of the same. Burning sensation was also reported by 2 cases in group B. No patient complained of pain or vesicles in our study. Majority of the cases from group A (22 cases) had the tendency to wash their hands 5-10 times a day. While 19 cases of group B had the habit of washing hands less than 5 times a day. Hence, frequency of washing was not directly associated with increased risk of side effects in our study. The practice of using moisturizers on hands was followed by 21 and 24 cases in group A and B, respectively. 2 and 3 cases respectively had the habit of using it after each time they washed their hands. Majority of the participants in the study mentioned that using moisturizer was a recently adopted practice following their changed hand-hygiene habits.

Manoeuvres of rinsing should be done gently, to avoid any physical irritation of the skin. The liberal use of moisturizers after hand washing is an essential step to maintain hydration of skin and further prevent any abnormal changes. It should be done multiple times a day, especially immediately after hand washing. Humectants like topical urea, propylene glycol attract water to stratum corneum and occlusive emollients like petrolatum, lanolin prevent water loss. Therefore, a combination of humectant and occlusive emollients is an ideal choice for a hand moisturizer. Furthermore, fragrance-free and hypoallergenic products reduce the risk of contact sensitization, thereby reducing risk of developing ACD. Moisturizing cream does not interfere with efficiency of sanitizers.

Prolonged wearing of protective gear like gloves, lead to sweating and humid environment which disrupts the skin barrier leading to increased sensitivity to physical or chemical irritants. It is recommended to wash hands and use a moisturizer whenever the gloves are taken off. Periodically change of gloves also helps to lower the humidity.

Limitations

The limitations of our study include the limited size of study population and the use of an online questionnaire with keeping in mind the social distancing measures.

A large scale multicentric study in the post pandemic era would further help in understanding the effects better.

CONCLUSION

The findings of our study suggest that use of hand-hygiene products, especially alcohol-based sanitizer is associated with some side-effects on the skin. However, they are mild like dryness and peeling of skin. Liberal use of moisturizers can prevent as well as manage these conditions. Other mild side effects can easily be managed by consulting a dermatologist. No major side effects were noted in our study.

Recommendations

Recommendations include: manoeuvres of rinsing hands should be done gently to avoid any physical irritation of the skin, liberal use of moisturizer especially after washing hands, and for healthcare workers we recommended to wash hands and use a moisturizer whenever the gloves were taken off. Periodically change of gloves is also suggested.

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REFERENCES

1. Remuzzi A, Remuzzi G. COVID-19 and Italy: what next? *Lancet*. 2020;395(10231):1225-8.
2. Cucinotta D, Vanelli M. WHO declares COVID-19 a pandemic. *Acta Biomed*. 2020;91:157-60.
3. Kaiser Permanente Washington Health Research Institute. Kaiser Permanente launches first coronavirus vaccine trial. 2020. Available at: <https://www.kpwashingtonresearch.org/news-and-events/recent-news/news-2020/kaiser-permanente-launches-coronavirus-vaccine-study-seattle>. Accessed on: 23 March 2020.
4. Bloomberg News. Chinese vaccine approved for human testing at virus epicentre. 2020. Available at: <https://www.bloomberg.com/news/articles/2020-03-18/chinese-vaccine-approved-for-human-testing-at-virus-epicenter>. Accessed on: 24 March 2020.
5. Gautret P, Lagier J-C, Parola P, Hoang VT, Meddeb L, Mailhe M, et al. Hydroxychloroquine and azithromycin as a treatment of COVID-19: results of an openlabel non-randomized clinical trial. *Int J Antimicrob Agents*. 2020;56(1):105949.
6. Wang Y, Zhang D, Du G, Du R, Zhao J, Jin Y, et al. Remdesivir in adults with severe COVID-19: a randomised, double-blind, placebo-controlled, multicentre trial. *Lancet* 2020;395:1569-78.
7. Coomes EA, Haghbayan H. Favipiravir, an antiviral for COVID-19? *J Antimicrob Chemother*. 2020;75(7):2013-4.
8. Indian Council of Medical Research. Advisory on the use of Hydroxychloroquine as prophylaxis for SARSCoV2 infection. Available at: <https://www.mohfw.gov.in/pdf/AdvisoryontheuseofHydroxychloroquinasprophylaxisforSARSCoV2infection.pdf>. Accessed on: 24 March 2020.
9. Agrawal S, Goel AD, Gupta N. Emerging prophylaxis strategies against COVID-19. *Monaldi Arch Chest Dis*. 2020;90(1):10.
10. Wilder-Smith A, Chiew CJ, Lee VJ. Can we contain the COVID-19 outbreak with the same measures as for SARS? *Lancet Infect Dis*. 2020;20(5):102-7.

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