

Research Article

KAP Study on Hand Hygiene in the Era of COVID19-SARS: A Dermatologist's Perspective

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Abstract

Hand Hygiene is one of the most effective and effective action one can take to reduce the spread of pathogens and prevent infections, including the COVID19 virus, which primarily spreads through droplets and contact transmission. Contact transmission involves the touching of the infected persons and/or contaminated objects or surfaces and hence hand hygiene plays a crucial role in this scenario.

Aims and objectives: A questionnaire based on Knowledge, Attitude and Practice (KAP) study was undertaken to evaluate the different aspects related to the use of Alcohol Based Hand Rubs (ABHR) and soap-water as hand hygiene methods in an attempt to prevent COVID19 transmission.

Materials and method: The questionnaire was first undertaken by 30 individuals as part of a pilot project so as to validate the same. After validation, the study was continued further, and the said questionnaire was administered to 300 subjects. Out of these 300 participants, 127 (42.3%) were in age group of 12-25 yrs, 107 (35.7%) were in age group of 26-50 yrs and 66 (22%) were more than 50 yrs of age. Out of these 300 participants 155 (51.7%) were males and 145 (48.3%) were female subjects. Of the total 300 subjects 64 (21.3%) were educated up to high intermediate school level (Class X), 48(16%) were up to high school (Class XII), 102 (34%) were graduates and 86 (28.8%) were postgraduates. Also, only those individuals were included in the study who were graduates and could read & understand the questionnaire in English language. Out of these 300 participants, 97 (32.2%) were Health Care Workers (HCW), 203 (67.8%) were from general population (non HCW). All the participants had access to soap, water, hand sanitizers and alcohol based hand scrubs. All of them were tech savy and had access to e-mail and internet facility, having whatsapp facility on their smart phones, so as to answer the questionnaire online, as hard copy was avoided owing to the possible spread of the corona virus through fomites.

Results: 53.5% of the responders believe that hand hygiene using ABHR/soap-water is an effective methodology and 38.6% of the responders felt that it is an extremely effective method to clean hands in order to prevent COVID transmission. 41.2% responders washed their hands for about 2-5 times in a day in the pre COVID era which eventually increased to 6-10 times a day in this COVID era. 73.5% responders stated that they've increased the use of chemicals/sanitizers/disinfectants in the COVID era which was bare minimum in the pre COVID era.

Discussion: Corona viruses are a group of highly infective, flu-like virus. Their symptoms can be mild like fever, running nose, mild gastric upset but can be fatal as well. The fact that it's a novel virus with no known vaccine readily available, it becomes imperative that prevention of person to person spread is achieved in order to minimize the strain on healthcare workers and an ill-equipped creaking healthcare system. When the need of the hour is prevention of disease transmission and achieving proper hand hygiene the harsh/damaging effects on the skin becomes an acceptable risk. Alongside is important to make people aware about the fact that the application of moisturizer to hands after an antiseptic wash prevents drying and manages the integrity of the skin barrier.

Keywords: COVID19; Corona virus; KAP study; SARS; Hand hygiene

Introduction

The ongoing research has shown that COVID-19 gets transmitted through respiratory droplets, aerosols or close contact. Contact

transmission occurs when contaminated hands or body parts touch the mucosa of the mouth, nose, or eyes. The virus can also be transferred from one surface to another by contaminated hands, which facilitates indirect contact transmission [1]. Therefore hand hygiene becomes an indispensable step in the prevention of COVID-19 transmission. Frail health care infrastructure in low and middle income countries puts their citizens at a greater disadvantage because they cannot cope with the burden of health care settings required to handle such cases which is compounded by the fact that these nations have a huge burden of high population. Consequently it becomes imperative that the general public is made aware about the best practices of hand hygiene, that includes alcohol-based hand rubs as well as cleaning the hands with soap and water, in order to prevent the spread of the COVID19 virus and other viruses and bacteria causing common cold, flu and pneumonia, thus reducing the general burden of disease [2].

Citation: Sundeep C, Aparajita L, D' Souza P. KAP Study on Hand Hygiene in the Era of COVID19-SARS: A Dermatologist's Perspective. Clin Med. 2021; 3(1): 1030.

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Publisher Name: Medtext Publications LLC

Manuscript compiled: Feb 06th, 2021

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Community members can play a crucial role in fighting COVID-19 by adopting frequent hand hygiene as part of their day-to-day practices. Also evidence from both the SARS and COVID-19 epidemics, shows that hand hygiene is very important to protect health care workers from getting infected. Alcohol-based hand rub products should contain at least 60% alcohol. Plain soap is effective at inactivating enveloped viruses such as the COVID-virus due to the oily surface membrane that is dissolved by soap, killing the virus. In addition, hand washing removes germs through mechanical action (WHO Guidelines on Hand Hygiene in Health Care 2009). Chlorinated water at 0.05% is not recommended for routine hand hygiene because it has detrimental effect on skin along with other additional toxic effects on human body. Most importantly, soap is easy to find and can be used effectively by all. It is advised to wash one's hands with soap and running water when hands are visibly dirty and if not then go for alcohol based hand rub. Undertaking hand hygiene at the right time, using the right technique, with either ABHR or washing with soap & water and then cleaning with disposable/clean towels is essential. WHO recommends right duration for Alcohol based hand rub which is 20 seconds to 30 seconds and washing with water and soap for 40 seconds to 60 seconds [3].

Due to increased use of soaps and alcohol hand rubs inadvertent and undesirable damage to the skin epidermal barrier may occur leading to Irritant Contact Dermatitis (ICD) in few individuals. The discomfort caused by symptoms of ICD should not interrupt the hand hygiene practices amidst this pandemic and hence one needs to come up with solution to tackle adverse effects on skin of ABHR/soap-water use so that individuals are able to continue hand hygiene regime diligently.

Materials and Methods

A knowledge attitude and practice based open labeled, cross sectional, questionnaire based study was conducted during a 2 month period from April 2020 to May 2020. A questionnaire was prepared in order to ascertain the knowledge attitude and practices of general public regarding hand hygiene in the era of COVID19-SARS.

The questionnaire was first distributed to 30 subjects as a part of pilot project so as to validate the pro forma. Necessary modifications in the same were done after evaluating results of the pilot study.

After validation of questionnaire the study was further continued by distributing the questionnaire to subjects. Out of these 300 participants, 127 (42.3%) were in age group of 12-25 yrs, 107 (35.7%) were in age group of 26-50 yrs and 66 (22%) were more than 50 yrs of age. 155 (51.7%) were males and 145 (48.3%) were female subjects. Of the total 300 subjects 64 (21.3%) were educated up to high intermediate school level (Class X), 48 (16%) were up to high school (Class XII), 102 (34%) were graduates and 86 (28.8%) were postgraduates. Also, only those individuals were included in the study who were graduates and could read & understand the questionnaire in English language. Out of these 300 participants, 97 (32.2%) were HCW, 203 (67.8) were from general population (non HCW). All the participants had access to soap, water, hand sanitizers and alcohol based hand scrubs. All of them were tech savvy and had access to e-mail and internet facility, having whatsapp facility on their smart phones, so as to answer the questionnaire online, as hard copy was avoided owing to the possible spread of the corona virus through fomites.

After explaining the purpose of the study, written and informed consent was obtained from all the study participants. Participants

unwilling to give consent or participate in the study were excluded from the study.

The questionnaire was aimed at evaluating the awareness, self-perception and attitude towards hand hygiene in the era of COVID19-SARS.

The questionnaire comprised of 15 questions and it was informed prior that few of these questions may have more than one correct answer.

The subjects were pre-informed about the time and date of administering the questionnaire and were sent on either whatsapp/ e-mail as hard copy of the questionnaire was avoided owing to the possible spread of the virus through fomites.

The total numbers of responses were collected, and data was analyzed.

Observation and Results

Total of 300 subjects participated in the study after they gave consent and eventually filled and returned the completed questionnaire. The details of questions prepared and the responses elicited are listed below:

1. How effective do you feel, is the use of Alcohol Based Hand Rub (ABHR)/hand wash/sanitizers to clean hands so as to prevent COVID transmission?

- a. Not effective
- b. Partially effective
- c. Effective
- d. Extremely effective

Answer: 53.9% responders said that hand hygiene is effective and 38.2% thought it to be extremely effective. While 6.9% thought it to be partially effective and 1% believed it is not effective at all.

2. How many times in a day did you use Alcohol Based Hand Rub (ABHR)/wash your hands with soap in pre COVID era?

- a. <2
- b. 2-5
- c. 6-10
- d. >10

Answer: 41.2% of the responders stated that they washed their hands 2-5 times in pre COVID era. 29.4% washed their hands 6-10 times per day and 15.7% washed their hands more than 10 times a day. Rest 13.7% said that their frequency of hand washing was <2 times per day in the pre COVID era.

3. How many times in a day are you using ABHR/hand wash in the present COVID era?

- a. <2
- b. 2-5
- c. 6-10
- d. >10

Answer: 41.2% of the responders said that they are washing their hands 6-10 times in a day and 33.3% informed that they did so more

than 10 times in a day. 22.6% of subjects continued to do so 2-5 times a day whereas meager 2.9% responders still washed their hands less than 2 times per day.

4. Are you using chemicals/sanitizers/disinfectants to clean surfaces/door knobs/metal/glass at home or office?

- Regular use like pre COVID times
- Increased use than pre COVID times
- Not applicable

Answer: A whopping 73.5% responders stated that they've increased use of chemicals/sanitizers/disinfectants whereas 17.6% stated that there has been no change in frequency of doing so. For the remaining 8.9% it was not applicable.

5. Are you using chemicals/sanitizers/disinfectants with bare hands to clean surface/door knobs/metal/glass at home or office?

- No
- Yes
- Not applicable

Answer: 46.5% of the responders denied usage of chemicals/sanitizers/disinfectants with bare hands but almost an equal percentage of 42.6% agreed that they were using the same with bare hands. For the rest 10.9% it was not applicable.

6. Do you sterilize face mask (Medical/Surgical/N95/N99) by disinfecting it with ABHR prior to reusing it?

- Never
- Sometimes
- Most of the times
- Always

Answer: Majority of 45.8% responders denied sterilizing face mask (Medical/Surgical/N95/N99) by disinfecting it with ABHR prior to reusing it. Rest 26%, 15.6% and 12.5% said they sometimes, most of the times and always (respectively), sterilize face mask by disinfecting it with ABHR prior to reuse.

7. How long should you rub your hands after applying ABHR (as per WHO guidelines)?

- <15 seconds
- 15-30 seconds
- 31-60 seconds
- >1 min

Answer: WHO recommends that the right duration for Alcohol based hand rub is about 20-30 seconds. 64% of the responders marked 15-30 seconds as their response. 13% chose 31-60 seconds, 7% preferred it for more than 1 minute whilst 16% marked more than 15 seconds as their response.

8. How long should you rub your hands after applying hand wash (according to WHO guidelines)?

- <30 seconds
- 31-60 seconds

f. 61-120 seconds

b. >2-5 mins

Answer: WHO recommends that the proper duration to wash with soap and water is 40-60 seconds. 41% marked more than 30 seconds as their response. 38% marked 31-60 seconds as their response which is coherent with the WHO's guidelines. 13% marked 61-120 seconds and rest 8% believes it should be between 2-5 minutes.

9. According to you which method of disinfection has maximum efficacy in regards to its antiseptic action?

- Alcohol based hand rub
- Hand wash with soap/water
- Both are equivalent
- Don't know

Answer: 35.7% believe its hand wash with soap/water whereas 32.7% think ABHR is more efficacious. Almost equivalent percentage of responder's viz. 30.7% believes both are equivalent. Rest 1% was unsure of the answer and preferred the option of d) don't know.

10. Do you follow WHO recommendations for hand washing and/or using alcohol based hand rub?

- Never
- Sometimes
- Most of the times
- Always

Answer: 27.7% responders were always following WHO recommendations for hand washing. 41.6% of them did it most of the times, 25.7% responders marked it as sometimes as their response, whilst 5% said they are never followed the WHO recommendations in this regard.

11. In Indian context, with limited health sector resources and large population, do you believe hand washing is an important step in preventing transmission of COVID?

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

Answer: Predominantly 60.4% strongly agreed to this fact, 32.7% responders were agreeable to the same, whereas 4% remained neutral. 3% of the responders disagreed with this ideology.

12. Do you feel excessive use of hand wash/ABHR can cause damage to the skin of your hands?

- No damage
- Partially damaging
- Damaging
- Extremely damaging

Answer: 50.5% responders feel that their skin has been partially

damaged, 31.7% felt that it has been damaged, 5% responders feel that it is extremely damaging and 12.9% responders feel that there is no damage associated with it.

13. Have you recently noticed any changes in the skin of hands after frequent use of ABHR and/or hand wash in the present COVID times? (Can choose multiple options)

- a. Redness
- b. Soreness
- c. Scaling
- d. Itching
- e. Burning
- f. Dryness

Answer: 83% of the responders said that they suffered from dryness- the most common symptom, next most common symptom was scaling suffered by 33% of the responders whilst 20.2% suffered from itching. Redness, soreness and burning were seen in 17%, 16% and 13.8% respectively in the responders.

14. How often do you moisturize your hands after washing/using ABHR?

- a. Never
- b. Sometimes (no change in frequency in pre COVID and COVID era)
- c. Increased Frequency in COVID era
- d. Decreased Frequency in COVID era

Answer: 42% of responders marked sometimes (with no change in frequency in pre COVID and COVID era) as their response. 33% said that they've increased the use of moisturizer in COVID era whereas 2% had a contrasting response as they've reduced the use of moisturizer. Rest 23% marked as never in their response.

15. What possible effect does moisturizing with cream/emollient etc. have on the efficacy of hand wash/ABHR's antiseptic action?

- a. No change
- b. Decreases antiseptic action
- c. Increases antiseptic action
- d. Can't say

Answer: 18.8% responders marked decreased antiseptic action as their preferred response, while 26.7% feel there is no change in antiseptic action. A small percentage of 6.9% responders feel moisturizer enhances the antiseptic action. Majority 46.5% couldn't comment on the antiseptic action.

Discussion

Coronaviruses are a group of highly infective, flu-like virus. Their symptoms can be mild like fever, runny nose, and mild gastric upset but can be fatal as well. COVID-19 is the disease caused by a new type of coronavirus that is spreading quickly around the world. Early symptoms include fever, cough and difficulty in breathing - similar to other flu-like illnesses.

CoVs are positive-stranded RNA viruses with a crown-like appearance under an electron microscope (coronam is the Latin term

for crown) due to the presence of spike glycoproteins on the envelope. SARS-CoV-2 belongs to the beta CoVs category. It has round or elliptic and often pleomorphic form, and a diameter of approximately 60 nm to 140 nm. Like other CoVs, it is sensitive to ultraviolet rays and heat. In this regard, although high temperature decreases the replication of any species of virus. Currently, the inactivation temperature of SARS-CoV-2 must be well elucidated. It seems that this virus can be inactivated at about 27°C. On the contrary, it may resist the cold even below 0°C. Furthermore, these viruses can be effectively inactivated by lipid solvents including ether (75%), ethanol, chlorine-containing disinfectant, peroxyacetic acid, and chloroform except for chlorhexidine [4]. Concerning the duration of contamination on objects and surfaces, a study showed that SARS-CoV-2 can be found on plastic for up to 2-3 days, stainless steel for up to 2-3 days, cardboard for up to 1 day, copper for up to 4 hours [4].

As with other respiratory pathogens, including flu and rhinovirus, the transmission is believed to occur through respiratory droplets (particles >5 µm to 10 µm in diameter) from coughing and sneezing. Aerosol transmission is also possible in case of protracted exposure to elevated aerosol concentrations in closed spaces. Analysis of data related to the spread of SARS-CoV-2 in China seems to indicate that close contact between individuals is necessary. Of note, pre- and asymptomatic individuals may contribute to up 80% of COVID-19 transmission. The spread, in fact, is primarily limited to family members, healthcare professionals, and other close contacts (6 feet, 1.8 meters) [4].

The fact that it's a novel virus with no known vaccine readily available, it becomes imperative that prevention of person to person spread is achieved in order to minimize the strain on healthcare workers and an ill-equipped creaking healthcare system. As is the case with many infectious diseases frequently and thoroughly washing hands constitutes the first line of defense against COVID-19. The route of transmission is *via* droplet infection which spreads by a person coughing or sneezing and there is potential risk of transmission *via* contaminated surfaces. Therefore, best hygiene practices form an important barrier in transmission of the virus from one individual to another.

Along with other behavioral modifications including social distancing frequent and rigorous hand washing practiced universally can help prevent further outbreaks and check the progress of this pandemic.

Now if we talk about proper hand washing WHO recommends the right way to clean your hands by following proper technique:

Step 1: Wet hands

Wet your hands and apply enough liquid soap to create a good lather. The temperature of the water should be between 35°C and 45°C.

Step 2: Rub palms together

Rub your hands palm to palm in circular motions. Rotate clockwise and anticlockwise.

Step 3: Rub the back of hands

With your fingers linked through the other hand, use your right palm to rub the back of your left hand. Then swap.

Step 4: Interlink your fingers

Link your fingers together, facing each other, into clasped hands. Then rub your palms and fingers together.

Step 5: Cup your fingers

Cup your fingers together, with your right hand over and your left hand under. With your fingers interlocked, rub the backs of them against your palms. Then swap.

Step 6: Clean the thumbs

Enclose your right hand around your left thumb and rub as you rotate it, then swap.

Step 7: Rub palms with your fingers

Rub your fingers over your left palm in a circular motion, then swap.

The right duration while cleaning hands with alcohol based hand rub is for 20-30 seconds while with water and soap is for 40-60 seconds.

Another question that needs to be answered is when should you wash your hands?

We need to wash our hands regularly, especially:

- After blowing your nose, coughing or sneezing.
- After visiting a public space, including public transport, markets and places of worship.
- After touching surfaces outside of the home.
- After touching money.
- Before, during and after caring for a sick or vulnerable person.
- Before and after eating.

Always wash your hands:

- After using the toilet.
- Before and after eating.
- After handling rubbish.
- After touching animals and pets.
- After changing babies' nappies or helping children use the toilet.
- When your hands are visibly dirty.

As it has been stated that Hand hygiene has become the most effective single measure to reduce the spread of infections through multimodal strategies, including access to the appropriate supplies therefore WHO came up with recommendations which are as follows:

1. One or several hand hygiene stations (either for hand washing with soap and water 5 or for hand rubbing with an alcohol-based hand rub) should be placed in front of the entrance of every public (including schools and healthcare facilities) or private commercial building, to allow everyone to practice hand hygiene before entering and when leaving it.
2. Facilities should be provided at all transport locations, and especially at major bus and train stations, airports, and seaports.
3. The quantity and usability of the hand hygiene stations should

be adapted to the type (e.g., young children, elderly, those with limited mobility) and number of users to better encourage use and reduce waiting time.

4. The installation, supervision, and regular refilling of the equipment should be the overall responsibility of public health authorities and delegated to building managers. Private sector and civil society initiatives to support the commodities, maintenance, and effective use are welcome.
5. The use of public hand hygiene stations should be obligatory before passing the threshold of the entrance to any building and to any means of public transport during the COVID-19 pandemic. Repeated hand hygiene whenever outside private homes can in this way become part of the routine of everyday life in all countries.
6. All private and public health care facilities should establish or strengthen their hand hygiene improvement multimodal programmes and rapidly ensure at a minimum procurement of adequate quantities of quality hand hygiene supplies, refresher hand hygiene training, and reminders and communications about the importance of hand hygiene in preventing the spread of the COVID-19 virus.
7. Local health authorities should ensure the continuous presence of functional hand hygiene stations (alcohol-based hand rub dispensers 8 or soap, water, and disposable towels) for all health care workers at all points of care, in areas where Personal Protective Equipment (PPE) is put on or taken off, and where health care waste is handled. In addition, functional hand hygiene stations should be available for all patients, family members, and visitors, and within 5 m of toilets, as well as at entrances and exits, in waiting and dining rooms, and other public areas. 9 Local production of alcohol-based hand rub formulations in national, sub-national or hospital pharmacies or by private companies should be strongly encouraged according to WHO guidance, 10 especially if commercial options are limited or too costly.
8. Health care workers should perform hand hygiene using the proper technique 11 and according to the instructions known as "My 5 moments for hand hygiene" 9, in particular, before putting on PPE and after removing it, when changing gloves, after any contact with a patient with suspected or confirmed COVID-19 virus, their waste, or the environment in the patients' immediate surroundings, after contact with any respiratory secretions, before food preparation and eating, and after using the toilet.

Harsh effects of soap/ABHR on skin

Along with all the recommendations and the accentuated importance of hand washing/use of ABHR, which is indispensable, we need to talk about the effects of soap and ABHR on the skin of hands. Quite a lot of the antibacterial and antiseptic wash preparations prevalent in the market today have some harsh effects on the skin. Usually these harsh antiseptic agents are not part of proper hand hygiene where washing with soap and warm water for about thirty seconds would suffice. Their availability as over the counter preparations was under scrutiny of regulatory bodies such as the FDA. These are not ordinary times though and in the tumultuous chaos of an outbreak the availability and access is severely limited.

When the need of the hour is prevention of disease transmission and achieving proper hand hygiene the harsh/damaging effects on the skin becomes an acceptable risk. At the same time it is important to make people aware about the fact that the application of moisturizer to hands after an antiseptic wash prevents drying and manages the integrity of the skin barrier. Individuals who are susceptible to flare ups of atopic dermatitis and hand eczema from having to use harsh soaps or frequent hand washing would be better served by proactively applying moisturizer to their hands after every wash so as to maintain the skin barrier.

The skin reactions related to hand hygiene are broadly divided into two major types:

- Irritant contact dermatitis: The most common type and includes symptoms such as itching, dryness, irritation and cracking and bleeding as well.
- Allergic contact dermatitis: Rarer represents an allergy to some ingredient in a hand hygiene product. Symptoms can be mild and localized or severe and generalized. Severe respiratory distress and anaphylactic shock are hallmarks of severe form.

In order to minimize the hand hygiene related irritant contact dermatitis cases amongst HCWs, three primary strategies have been devised:

- Selection of less irritating hand hygiene products.
- Avoidance of certain practices which increase the risk of skin irritation i.e., washing hands before and after using alcohol based hand rubs or donning of gloves without properly drying one's hands first. HCWs must learn to dry hands completely before donning gloves and not washing hands before and after alcohol applications.
- Use of moisturizing skin care products following hand cleansing. Hand lotions and skin creams include amongst their ingredients various humectants, fats and oils which hydrate the skin by replace the altered or depleted skin lipids and provide strength to the skin barrier [5].

Summary

With the entire world mired in a battle against an invisible enemy the novel coronavirus which has crippled economies and brought about a huge shift in human interactions, the practice of proper hand hygiene assumes an important role in order to prevent rampant spread.

The use of soaps ,antibacterial washes and alcohol based hand rubs which is readily available to people from all different economic strata all over the world is going to be the mainstay in breaking the chain of transmission.

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