Real-world assessment, relevance, and problems in use of personal protective equipment in clinical dermatology practice in a COVID referral tertiary hospital

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Abstract

Background: Doctors and healthcare workers (HCW) are at frontline in control of the pandemic caused by the novel coronavirus infection (COVID-19). The virus is transmitted by contact, droplet, and airborne transmission; hence, hand hygiene, social distancing, environmental disinfection, and use of appropriate personal protective equipment (PPE) form important components to protect HCWs from cross-infection. Appropriate use of PPE is of paramount importance not only to reduce the risk of transmission but also to maintain adequate stock for those who are dealing directly with COVID-19 patients.

Aims: In this article, we aim to provide the rationale for appropriate use of PPE in the dermatology setting in the current scenario. We have also discussed the scientific evidence for use of each component of protection and the practical problems faced in our COVID referral tertiary hospital.

Methods: Our review was based on articles that have studied or analyzed the efficacy of various protective measures being utilized by health workers against spread of COVID-19. This was done by carrying out a PUBMED search with terms "coronavirus, COVID-19, personal protective equipment (PPE), transmission, mask, face shields, goggles, gloves." We also scrutinized the various pragmatic issues being faced by doctors in our setup while using PPE.

Results: In order to maximize the appropriate use of PPE, the rationale for use needs to be understood and problems encountered in daily practice need to be addressed.

Conclusion: Adherence to protective measures and use of PPE is of utmost importance for HCWs to prevent cross-infection in this pandemic. The use of PPE can limit transmission to a great extent, but appropriate use and avoiding misuse is equally important in the dermatology setting in order to avoid depletion of stock. It is also essential to consider various practical issues with use of PPE and device measures to avoid them so that breach in protocols can be prevented and spread of infection minimized.

Keywords

coronavirus, COVID-19, dermatology, healthcare workers, personal protective equipment
With the number of total cases of coronavirus disease 2019 (COVID-19) infection rising to an alarming figure of 27.3 million across 213 countries, the pandemic does not show any sign of abating. Doctors and other healthcare professionals are on the frontline in the fight against this novel viral infection that has already claimed 897,219 lives. In this context, use of personal protective equipment (PPE) is a much-needed and important aspect as its appropriate use reduces the risk of viral transmission and infection. On the other hand, inappropriate use not only increases risk of infection but also poses threat of depletion of limited stock especially for those involved in direct care of patients infected with COVID-19.

In this article, we provide the rationale for use of appropriate PPE in dermatological practice based on the evidence that has percolated from studies and guidelines. We have also discussed various practical issues faced with use of PPE in our setting. The aim of PPE remains twofold: to prevent healthy patients from getting infected and at the same time prevent infection in the healthcare staff, keeping in mind that each person who is infected acts as an amplifying vector transmitting the virus to several others even before symptoms appear.3

2 | TRANSMISSION DYNAMICS AND ROLE OF ASYMPTOMATIC INFECTION IN SPREAD

It is pertinent to understand the transmission dynamics of the novel coronavirus severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in order to devise appropriate precautionary measures in terms of use of PPE.

COVID-19 is a highly contagious respiratory infection that is transmitted by either direct or indirect “contact” modes or by airborne transmission. Direct “contact” mode indicates person to person contact between an infected and susceptible host, while indirect contact occurs via a fomite that can be any object contaminated with infectious viral particles. The predominant mode of spread is through airborne transmission that does not require physical contact. This can occur by coughing or sneezing that generates droplets greater than 5 microns or by inhaling aerosol particles that are less than 5 microns that remain in air for few hours.

There is clear evidence that asymptomatic or presymptomatic individuals account for majority of cases and play a major role in spread of disease.4 Arons et al have shown that live coronavirus shedding from the nasal cavity was pronounced even before symptoms appear pointing to the role of presymptomatic individuals in spread of disease.5 Previous studies have shown that breathing and speech can generate large quantities of aerosol particles that are typically less than 1 micron in diameter but are sufficiently large to carry viruses.6 Further, Asadi et al have shown that the number of aerosol particles generated by the act of speaking depends on the volume of speech with higher number of particles produced with higher volume.5 The same author has suggested that a 10-minute conversation with an "asymptomatic super-emitter" can generate a cloud of 6000 aerosol particles that can be inhaled by people in proximity.6 Aerosol particles produced by breathing and talking are too small to settle because of gravity and are carried by air currents and dispersed by air turbulence and diffusion.7 Recent work has demonstrated that aerosolized SARS-CoV-2 remains viable in the air for few hours.8 These aerosols produced from infected persons pose an inhalational threat in enclosed spaces with poor ventilation. This may account for the belief that enshrines the advice of brief interaction and ensuring adequate ventilation of enclosed spaces.

Herein, it may be reiterated that the presence of viral particles does not necessarily equate with their potential for transmission to a susceptible host as there is no evidence of corroborative viability of the virus.

Based on the transmission dynamics and modes of spread, the following measures with their rationale are advocated for protection of healthcare workers (HCWs) to prevent cross-infection:

2.1 | Importance of hand hygiene

Performing hand hygiene is one of the most effective and simple measures to prevent transmission of COVID-19 infection. Studies have shown that hand washing is associated with 24% reduction of viral transmission. Cleansing of hands can be done by using either soap and water or an alcohol-based hand rub (AHBR). The latter works effectively against lipophilic enveloped viruses (eg, SARS-CoV-2) and can be used when hands are not soiled visibly. AHBRs (>3 mL on each hand) are useful as they cause denaturation of proteins, thereby inactivating enveloped viruses including coronavirus.9 WHO recommends ABHRs that contain ethanol 80% v/v or isopropanol 75% v/v as the active component due to their marked virucidal effect.10

On the other hand, frequent hand washing among HCWs (>20 times in a day) can lead to skin damage as reported by Lan et al in a
study in which 75% of the workers developed damaged skin of the hand. Various measures that can be adopted to reduce the chances of skin damage include application of hypoallergenic moisturizers on intact skin after hand wash, avoidance of hot water, and use of qualified alcoholic sanitizer as a hand disinfectant. Alternatively, two pairs of gloves can be worn and only the outer set can be removed between patients for hand wash. Another practical advice is to use a single pair of hypoallergenic glove that can be sanitized with AHBR frequently. But it must be pointed out that constant use of gloves can lead to discomfort that may affect the clinician’s work especially those working in hot and humid countries.

2.2 | Rationale behind social distancing

Social distancing, also known as “physical distancing,” implies keeping space between each other outside the house. The ideal distance has been defined by Centers for Disease Control and Prevention (CDC) as 6 feet or about 2 arms’ length. As SARS-CoV-2 spreads between people who are in close contact (within 6 feet) for a prolonged period, social distancing reduces this contact thereby preventing spread of infection among people who may be infected but have not been identified and isolated (Figure 1). However, the ideal distance should be re-assessed as there are various factors like wind speed and indoor environment that affect the “ideal” social distance. Nevertheless, adherence to social distancing is all the more important with lockdowns being lifted and people resuming work that has been done to boost the economy but can pose a risk of exponential spread of infection. This has given way to the concept of zone-based social distancing that allows interactions between people in a particular zone and allow for zonal lockdowns if problems arise. This is more feasible way to lift restrictions and deal with the transition.

The guidelines in India have variably mentioned a distance of 1 or 2 m and a contact time of 15 minutes, but the scientific validation of this advice is not on a firm footing as a combination of various factors like immunity and viral load may need to be factored in this advice in real-world scenarios.

2.3 | Disinfection and environmental cleaning

Evaluation of 22 studies has shown that human coronaviruses such as SARS can persist on inanimate surfaces (metal, glass or plastic) for up to 9 days, but can be efficiently inactivated by surface disinfection procedures with 71% ethanol, 0.1% sodium hypochlorite, or 0.5% hydrogen peroxide within 1 minute. Other biocidal agents such as 0.2% benzalkonium chloride or 0.02% chlorhexidine digluconate are less effective. The viral load on such surfaces can be reduced by disinfection especially of frequently touched surfaces.

The CDC recommends routine cleaning of frequently touched surfaces with soap and water followed by use of a household disinfectant like bleach solution or 70% alcohol. Such surfaces include tables, doorknobs, light switches, countertops, handles, desks, phones, keyboards, toilets, faucets, and sinks. The solution should be freshly prepared and should be left on the surface for at least 1-minute ensuring good ventilation during use. Disposable gloves should be worn by the worker to clean and disinfect the area. Various guidelines mention concentration of sodium hypochlorite that ranges from 0.5% to 1%. Alternatively, fumigation machines can be used for rooms to evenly spray large surfaces using sodium hypochlorite (Figure 2). While using such machines, it should be kept in mind that they ought to be directed to the surface and not in the air. Also, spraying should not be followed by wiping the surface as the purpose of the procedure is defeated.

2.4 | Use of appropriate PPEs

Personal protective equipments are protective gears designed to safeguard the health of workers by minimizing the exposure to a biological agent. Components of PPE include face shields, goggles, masks, coverall/gowns, head covers, and shoe covers.

2.4.1 | Use of masks

Efficacy of masks in preventing infection

Various national and international guidelines unanimously recommend use of N95 respirators (Figure 3A) for all aerosol-generating
procedures. However, there is inconsistency in recommendations for use of these masks for non-aerosol-generating procedures and routine care of patients. A meta-analysis done by Bartoszko JJ et al evaluated 4 randomized controlled trials that have compared the efficacy of medical masks to N95 respirators in preventing laboratory confirmed viral infection and respiratory illnesses including coronavirus in HCWs. Evidence from the existing data suggests that the two type of masks offer similar protection against these illnesses during non-aerosol-generating care. However, findings cannot be generalized to SARS-CoV-2 as the analysis included only one trial that individually studied cases of coronavirus infections.

Based on the evidence generated, it seems that for routine dermatological practice a three-ply mask would suffice, but an N95 mask may be used if desired. However, use of N95 respirators is warranted while performing procedures on mucosal regions and other aerosol-generating procedures (Figure 3B). Intubation simulation experiments have found secretions from exposed skin and hair of HCWs necessitating the use of proper head gear covering the hair, ear, and neck while doing such procedures.

As far as the use of cloth masks is concerned, laboratory studies have shown that penetration of particles through these masks is very high (97%) compared with medical masks (44%). There are various issues associated with use of cloth masks, which include increased risk of infection due to moisture, liquid diffusion, and pathogen retention. They do not provide a good fit and cause peripheral air leakage. There is no literature regarding their reuse and decontamination. Though cloth masks are a low-cost alternative they are not recommended for use by HCWs. However, protection by cloth mask is better than wearing no mask. Also, use of cloth mask reduces outward transmission as the viral particles are trapped and are no longer available as aerosols that hang in the air or settle on surfaces, thereby decreasing contamination of environment.

Issues with use of N95 masks

- An important component that determines the functional efficacy of N95 masks is the mask fit. Untrained individuals are not able to achieve proper mask fit, hence compromising efficacy. Addition of peripheral vaseline barrier has been shown to prevent peripheral air leakage. However, this may lead to occlusion miliaria and acne.
- Breathing difficulties are seen due to increase in breathing resistance. This has been proven in a study conducted on human volunteers that showed a mean increase of 126% and 122% in inspiratory and expiratory flow resistance, respectively, with use of N95 respirators. There was also a reduction of 37% in air exchange volume with increase in levels of carbon dioxide.
- Fogging of glasses due to exhalation of air from the mouth.
- Skin-related reactions like marks on face, itching, burning, and irritation over the area. Though the manifestations are mild, these
can lead to breach in PPE protocol as the HCW is prompted to touch the mask to shift the site of pressure. Also, this can lead to touching of face even when not wearing PPE.

- Face dermatitis: Although less common, face dermatitis can occur with use of N95 masks. Most common sites described are the nasal bridge, hands, cheek, periocular, and perioral regions.\(^ {25} \) The main risk factor for occurrence of facial dermatitis is the duration of use.

- In the last few months, we have seen cases of acne that have been induced by the use of mask and correlate with its morphological distribution. These may be a variant of tropical acne.

**Practical tips for use of N95 masks/respirators**

- A surgical mask covering the N95 respirator can be used to prolong longevity (Figure 4A).

- To decrease the chances of pressure induced marks and abrasions, a surgical mask can be worn beneath the N95 mask (Figure 4B), though this may increase the discomfort in hot and humid environments.

- Masks with flexible wire on top can be used that can be molded along the bridge of nose and prevent exhaled air from the mouth from causing fogging. Alternatively, a tissue or tape can be used inside the top of the mask to capture moisture.

- Pressure injuries can occur where the mask is in contact with skin over bony prominences (forehead, nasal bridge). Various barrier film sprays and nonadherent dressings containing soft silicon and paraffin can be used prior to wearing masks to prevent pressure injuries.

**2.4.2 Goggles and face shields**

Eyes provide a route of entry to viral particles, though less commonly. Goggles offer protection to the conjunctiva that can be exposed to infected droplets and aerosols from patients. Regular spectacles are not considered adequate eye protection though these should be preferred over contact lens as the latter causes eye irritation leading to frequent touching of eyes. Randomized trials have shown that eye protection alone does not prevent transmission of infection of viral illnesses (there is lack of data on SARS-CoV-2) and has to be used along with other protective equipment.

Goggles can be worn over spectacles (Figure 3B), but it causes discomfort for the wearer and a face shield may be preferred. Goggles can be of two types; one where it is a single unit while in the other, glass piece is attached to the frame. The latter have a high chance of displacement of the glass viewing aspect. Also, those doctors who wear progressive glasses can face a problem as the nose rest is compromised by the N-95 respirator and this alters the visual axis of such glasses, leading to discomfort due to difficulties in accommodation.

Face shields can be used as an alternative to goggles and they provide protection to larger area of face from splashes and splatter of aerosols. Components of a face shield include visor, frame and a suspension system. Visors are the lenses or windows made out of polycarbonate, acetate, polyethylene terephthalate glycol (PETG) or polyvinyl chloride. Polycarbonate is most commonly used though PETG is economical. The longevity of visor can be extended by using extra coatings with anti-glare, anti-fogging, and scratch resistance properties.\(^ {26} \) Visors can be of different lengths extending up to mid-face, full face (Figure 5A) or reaching the anterior neck area (Figure 5B). Wider visors offer more peripheral protection. Frames used for face shields are generally made of plastic and can be adjustable or nonadjustable. Detachable frames offer the advantage of replacement of visor when required. Suspension systems provide fully or partially circumferential attachment that can be adjustable or nonadjustable. The latter uses plastic straps worn around the head and are easier to don and doff.

Though the evidence for efficacy of face shields in preventing viral transmission is minimal, one study that used cough stimulation found that the risk of inhalation exposure was reduced by 95%
immediately after aerosol production.\textsuperscript{27} The protection was decreased after 30 minutes due to flow of particles around the sides of the shield. Hence, face shields should only be used as an adjunct to other facial protection equipment. Recommendations for use are not consistent, but few points should be kept in mind while using a face shield. They should be snugly fit with no gap between the forehead and shield. Good quality material should be used (OHP 150-200 micron) for visual clarity.\textsuperscript{28} Full length face shields should be used, and the outer edges should reach the ear. The front of face shield should not be touched, and it should be removed with gloved hands from behind.

There are few practical issues we faced with use of face shields. These were poor visibility especially with patient seated at a distance of 1-2 m. Also fogging can occur if the visor is not of suitable quality. Face shields are bulkier than googles but are comfortable to wear and provide protection to larger portion of face.

2.4.3 | Gloves

Gloves are intended to provide broad barrier protection. One layer of gloves is adequate for protection. Latex and nitrile gloves are available, and the latter are preferred due to lower risk of allergic reaction. Reusing of gloves is not recommended.

In the outpatient setting, gloves should be used for patient examination. Also, HCWs with hand eczema (Figure 6) should use gloves routinely to avoid frequent washing of hands.

\textit{Issues with use of gloves}

- Maceration and wrinkling of skin on prolong use. Moisturizers can be used before wearing gloves.
- Contact dermatitis to latex can occur especially in macerated skin. Cotton gloves can be worn beneath the latex gloves in such cases.

2.4.4 | Full body PPE

Aprons, gowns, and coveralls are the types of PPE that offer full body protection to HCW (Figure 7). Coveralls should be made of
### TABLE 1  The components of PPE, rationale of use, advantages, and issues faced in the real-world scenario in a COVID hospital

| PPE                        | Rationale                                                                 | Comment                                                                 | Advantages                                                                 | Real-world scenario (in a COVID hospital in north India)                                                                 |
|---------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| Face shield and goggles  | Protects the mucous membrane of eyes/nose/mouth from droplets generated by cough/sneeze/aerosol-generating procedures | Face shield should cover forehead, extend below the chin and wrap around side of face | Affordable, can be reused indefinitely<br>Can be easily cleaned | Face shield/goggles may reduce visibility due to fogging/condensation, which may already be compromised due to the patient sitting 1-2 meter away<br>Goggles—It is difficult to wear prescription glasses along with goggles. Face shields may be preferable in such HCWs<br>Scarcity of studies that have documented efficacy of face shields in prevention of transmission |
|                           | Also prevent inadvertent touching of these body sites                    | Goggles should provide good seal and accommodate prescription glasses   |                                                                           |                                                                                                                     |
| Masks                     |                                                                           |                                                                        |                                                                           |                                                                                                                     |
| (i) Triple layer masks    | Disposable, fluid resistant                                               | Which one to use depends on the setting and risk category—N95 masks may be preferable for HCWs in clinics/settings without a separate screening area. If patient has been thermally screened, triple-ply masks may suffice | Comfortable to use | Breathing difficulties, discomfort, leave marks on face after removal<br>Cost is more compared to triple-ply masks<br>Uncomfortable to use for people wearing spectacles                                                                 |
| (ii) N95 respirator mask  | Protects from inhalation of infectious aerosols                           |                                                                        |                                                                           |                                                                                                                     |
|                           | High filtration efficiency to airborne particles (more than triple layer), provides a tighter air seal |                                                                        |                                                                           |                                                                                                                     |
| Gloves                    |                                                                           |                                                                        |                                                                           |                                                                                                                     |
| (i) Latex gloves          | Prevents transmission by touching of objects potentially contaminated by suspect/confirmed cases of COVID-19 | Nitrile gloves are preferred to latex gloves as they resist chemicals and have less rate of allergies. Nonpowdered gloves are preferred to powderd gloves |                                                                           | HCsWs with hand eczema may wear gloves to avoid repeated hand washing or sanitizing. But the need to change gloves between patients should never be ignored |
| (ii) Nitrile              |                                                                           |                                                                        |                                                                           |                                                                                                                     |
| Coverall/gowns            | Protect torso from exposure to virus, creates a barrier to eliminate or reduce contact and droplet exposure | Used by HCWs working in close proximity (within 1 meter) of suspected/confirmed COVID-19 cases or their secretions. Gowns are easier to put on and remove | Good full body protection | Fluid and virus resistance may come at the cost of "breathability" of the material, making them difficult to don for >1 hour, more so in hot-humid climates<br>Donning and doffing are difficult and contamination can occur on removal<br>Shortage in supply<br>Stringent standards need to be adhered to ensure quality |
| Shoe covers               | Made of impermeable fabric and are used to facilitate personal protection and decontamination | Shoe covers should reach the ankles                                   |                                                                           |                                                                                                                     |
| Head covers               |                                                                           | Coveralls have an attached hood. Those using gowns need to use head cover separately |                                                                           |                                                                                                                     |
material impermeable to blood and body fluids. Light colors are preferable as its easier to detect contamination. PPE are meant for single use and before procuring, certificate of analysis from national or international organizations should be checked to ensure conformity to standards. In India, guidelines advise for a quality of ISO 16603 class 3 exposure or equivalent.

Coveralls are more difficult to remove compared to gowns. Though they offer the best protection, donning and doffing are issues. More breathable types of PPEs are available, and evidence has shown that these lead to similar level of contamination but are more comfortable to wear. Modified PPEs are available that have gloves attached at the cuff so that both the gloves and gown are removed together. Tabs can be added to gloves to reduce contamination. Though there are 24 different studies evaluating the efficacy of PPEs, majority of these used fluorescent markers to simulate infection rather than a real-world scenario of HCWs dealing with infected patients.

**Issues with use of PPE coveralls**
- Adherence to quality is a major issue being faced by many developing countries. Various PPEs are available with varying qualities manufactured by all kinds of firms. Standards have been laid down by various national and international organizations, but their adherence is a major issue.
- Most of the PPE coveralls have varying levels of plastic making it very difficult to wear in hot and humid climates leading to excessive sweating especially in triage and screening rooms that are not air conditioned. We have seen cases of miliaria and folliculitis apart from hyperhidrosis compounded by PPE.

### Table 2: Recommended personal protective equipment (PPE) based on risk profile of healthcare worker (HCW) working in a dermatology clinic/center

| Staff Activity                                      | Risk   | Personal Protective Equipment                                                                 | Remarks                                                                 |
|-----------------------------------------------------|--------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| Help desk/registration counter                     | Mild   | Triple-layer medical mask, Latex examination gloves                                       | Physical distancing to be followed at all times                         |
| Doctors chamber                                     | Mild   | Triple-layer medical mask, Latex examination gloves                                       | No aerosol-generating procedures should be allowed                      |
| Minor OT (dermatology)                             | Moderate | N95 masks, face shield, head cover, Latex examination gloves | All precautions to be taken while performing procedures on face and mucosal regions |
| Pharmacy counter                                    | Mild   | Triple-layer medical mask, Latex examination gloves                                       | Frequent use of hand sanitizer is advised over gloves                  |
| House keeping/sanitary staff                        | Mild   | Triple-layer medical mask, Latex examination gloves                                       | Staff should be educated regarding all measures                         |

### Table 3: Sterilization of personal protective equipment (PPE)

| Equipment | Recommended sterilization technique                                                                 |
|-----------|---------------------------------------------------------------------------------------------------|
| Face shield | Dip in soap water/1% sodium hypochlorite × 10 minutes, Drying in sun light and cleaning with sanitizers with gloved hands, 2% glutaraldehyde for 10 minutes, wash it with normal saline again followed by drying |
| N95 masks | Reuse after 4 days/when moisture dried up (do not use if seal is lost), Ultraviolet germicidal irradiation, vaporous hydrogen peroxide, moist heat |
| Clothes | Soak in 0.5% Sodium hypochlorite solution × 15 minutes → wash with detergent & water at high temperature → dry |
| Cloth masks | Soak in 0.5% Sodium hypochlorite solution × 15 minutes → immediately wash with soap & water → dry |

*In case of shortage.*
• Donning and doffing is difficult, and contamination can occur on removal unless accompanied by verbal instructions.
• Misuse of PPE, in the form of inappropriate use where it is not required is causing shortage.

The components of PPE, rationale for use, advantages, and issues faced in the real-world scenario in a COVID hospital are mentioned in Table 1.

Table 2 outlines the recommended PPE based on risk profile of HCW working in a dermatology clinic/center.

3 | STERILIZATION OF PPE: DISINFECTION OF MASKS/RESPIRATORS

According to the guidelines issued by the CDC, N95 masks are not approved for routine decontamination. However, during times of shortage, decontamination and reuse can be done to ensure continued availability. The methods of decontamination are based on the limited research on various characteristics like filtration performance, fit, and safety of the masks for the wearer. Methods using microwave irradiation, steam, and heat incubation compromise the integrity of masks and are not recommended. Treatment with bleach causes release of chlorine gas on exposure to moisture and also results in residual odor. Ultraviolet germicidal irradiation, vaporous hydrogen peroxide, and moist heat are the methods recommended by CDC for decontamination.30 However, recent findings have shown that gamma radiation reduces the filtration efficiency even when low doses are used.

Studies have shown that SARS-CoV-2 persists on plastics, stainless steel, and cardboard surfaces for up to 72 hours. Based on this, five respirators can be issued to each HCW. The worker will wear one respirator each day and store it in a breathable paper bag. The same can be used after a minimum period of five days provided these are used and stored properly.

Disposable medical face masks should not be reused. Masks should be removed using appropriate technique. The front part of mask should not be touched, and it should be disposed of immediately in an infectious waste bin followed by hand hygiene.

Various methods recommended for sterilization of PPE have been outlined in Table 3.

4 | CONCLUSION

Adherence to protective measures like hand hygiene, social distancing, environmental disinfection, and use of PPE is of utmost importance for HCWs to prevent cross-infection in this pandemic. While adhering to guidelines and standard precautions, it is important to understand the scientific rationale behind these measures. The use of PPE can limit transmission to a great extent but appropriate use and avoiding misuse is equally important in the dermatology setting in order to avoid depletion of stock. It is also essential to consider various practical issues with use of PPE and device measures to avoid them so that breach in protocols can be prevented and spread of infection minimized.

CONFLICT OF INTEREST
None.

DISCLAIMER
We confirm that the manuscript has been read and approved by all the authors, that the requirements for authorship as stated earlier in this document have been met, and that each author believes that the manuscript represents honest work.

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