

LETTER

Skin changes attributed to protective measures against COVID-19: A compilation

Dear Editor,

With the outbreak of COVID-19 pandemic, millions of health care workers all across the globe have been working as frontline warriors, in the screening and treatment of patients.¹ As a part of the protective measures,¹ the health care workers are using personal protective equipments (cap, goggles, face shield, surgical mask, gown and gloves), hand sanitizers, and prophylactic drugs like hydroxychloroquine.² These measures have been related to the development of certain cutaneous manifestations.³

In a recently published cross-sectional study, prevalence of skin injuries among medical staff wearing personal protective equipment (PPEs) was found to be 42.8%. Prevalence of injuries was higher in males, doctors (as compared to nurses), ones wearing grade 3 PPE, those with daily wearing time >4 hours, those over 35 years old, and the ones with heavy sweating.⁴ In another report, prevalence of skin damage was 97.0%, nasal bridge being the most commonly affected site (83.1%).⁵

The skin changes associated with protective measures can be seen in four scenarios:

1. Skin changes due to PPEs.
2. Skin changes due to use of hand sanitizers.
3. Skin changes due to hydroxychloroquine intake.
4. Exacerbation of preexisting skin disorders.

The symptomatology and clinical picture are summarized in Table 1.

The cutaneous manifestations due to PPEs are attributed to the hyperhydration effects of the materials and constant friction.⁵ Besides, alcohol-based hand sanitizers (containing ethanol or isopropyl alcohol) solubilize the components of intercellular lipids, which leads to disruption of the epidermal barrier.⁶ Patients may complain of a burning or stinging sensation followed by redness, itching, and dermatitis. Moreover, during the ongoing pandemic, hydroxychloroquine has been extensively used as a prophylactic drug, on account of its *in vitro* antiviral activity.⁷ It can rarely precipitate some cutaneous changes, which are summarized in Table 1. The drug can lead to many other cutaneous alterations like pigmentation, bleaching of hairs, and exacerbation of psoriasis. However, it is unlikely to produce such changes at a suboptimal dose of 400 mg/week compared to therapeutic doses in other conditions.

Prompt dermatological referral is always helpful in the management of these conditions. Mild changes of inflammation and dryness may be managed with moisturizers and low potency steroids. Topical antibiotic (mupirocin or fusidic acid) creams or ointments are useful for abrasions, macerations, and fissures. Severe itching associated

with contact dermatitis needs administration of second-generation antihistamines and mid-potent topical steroids. Miliarial dermatitis usually responds to soothing agents like calamine and topical steroids,

TABLE 1 Summary of cutaneous changes associated with the use of protective measures

Scenario	Symptomatology and clinical presentation
Skin changes due to personal protective equipments (PPE)	<ol style="list-style-type: none"> 1. Folliculitis, pruritus, contact dermatitis, pressure urticaria, and contact urticaria (due to cap) 2. Friction and occlusion induced dermatitis, contact dermatitis, pressure urticaria, and contact urticaria (due to goggles and face shields) 3. The surgical mask (including N95 mask) leads to erythema, papules, pustules, acneiform eruptions, acne mechanica, pigmentation, and purpuric changes along the line of attachment of the mask, urticarial eruptions and contact dermatitis to metals, formaldehydes, and other preservatives 4. The gowns and coveralls lead to severe perspiration leading to miliaria, contact dermatitis to textile dyes, maceration, and intertrigo itching and stinging. 5. Gloves are mostly responsible for causing desquamation, erythema, allergic contact dermatitis to rubber accelerators and miliaria, pompholyx due to prolonged occlusion 6. Boots often lead to contact dermatitis due to metals, macerations, erosions and secondary fungal infections, and pompholyx
Skin changes due to use of hand sanitizers	<ol style="list-style-type: none"> 1. Irritant contact dermatitis Contact allergy: This may manifest immediately as contact urticaria or delayed as allergic contact dermatitis.
Skin changes due to hydroxychloroquine intake	<ol style="list-style-type: none"> 1. Photosensitivity 2. Acute urticaria 3. Erythema multiforme 4. Fixed drug eruption 5. Drug rash with eosinophilia and systemic symptoms (DRESS syndrome) 6. Stevens-Johnson syndrome and toxic epidermal necrolysis
Exacerbation of preexisting skin disorders	<p>Acne vulgaris, seborrheic dermatitis, rosacea, psoriasis (rare), intertrigo, and dermatophytosis</p>

apart from antihistamines.⁸ Application of emollients before wearing masks and gloves, and posthandwashing is helpful in contact dermatitis. Maceration is managed well by the application of hydropathic compress and topical zinc oxide ointment. Preexisting dermatoses, which show exacerbation, should be properly managed by the dermatologist based on the severity and presentation. In cases of secondary fungal infection, skin should be kept dry, apart from prescribing topical and systemic antifungal drugs. Most importantly, managing shorter rotating shifts to reduce exposure time and working in a cooler environment are the best possible remedies.⁹

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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.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.


AUTHOR CONTRIBUTION

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REFERENCES

1. The Lancet. COVID-19: protecting health-care workers. *Lancet*. 2020; 395(10228):922. [https://doi.org/10.1016/S0140-6736\(20\)30644-9](https://doi.org/10.1016/S0140-6736(20)30644-9).
2. Zhang B, Zhai R, Ma L. 2019 novel coronavirus disease epidemic: skin protection for healthcare workers must not be ignored [published online ahead of print, 2020 May 2]. *J Eur Acad Dermatol Venereol*. 2020. <https://doi.org/10.1111/jdv.16573>.
3. Lan J, Song Z, Miao X, et al. Skin damage among health care workers managing coronavirus disease-2019. *J Am Acad Dermatol*. 2020;82(5): 1215-1216. <https://doi.org/10.1016/j.jaad.2020.03.014>.
4. Jiang Q, Song S, Zhou J, et al. The prevalence, characteristics, and prevention status of skin injury caused by personal protective equipment among medical staff in fighting COVID-19: a multicenter, cross-sectional study. *Adv Wound Care (New Rochelle)*. 2020;9(7):357-364. <https://doi.org/10.1089/wound.2020.1212>.
5. Elston DM. Letter from the Editor. Occupational skin disease among healthcare workers during the coronavirus (COVID-19) epidemic. *J Am Acad Dermatol*. 2020;82:1085-1086.
6. Long H, Zhao H, Chen A, Yao Z, Cheng B, Lu Q. Protecting medical staff from skin injury/disease caused by personal protective equipment during epidemic period of COVID-19: experience from China. *J Eur Acad Dermatol Venereol*. 2020;34:919-921.
7. Sardana K, Sinha S, Sachdeva S. Hydroxychloroquine in dermatology and beyond: recent update. *Indian Dermatol Online J*. 2020;11:453-464.
8. Yan Y, Chen H, Chen L, et al. Consensus of Chinese experts on protection of skin and mucous membrane barrier for health-care workers fighting against coronavirus disease 2019. *Dermatol Therapy*. 2020;33(4):e13310. <https://doi.org/10.1111/dth.13310>.
9. Gheisari M, Araghi F, Moravvej H, Tabary M, Dadkhahfar S. Skin reactions to non-glove personal protective equipment: An emerging issue in the COVID-19 pandemic [published online ahead of print, 2020 Apr 17]. *J Eur Acad Dermatol Venereol*. 2020. <https://doi.org/10.1111/jdv.16492>.