Dermatological Manifestation due to Preventive Measures Used During COVID-19 Pandemic

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Sir,

Healthcare workers (HCWs) as well as general population adopted the use of facemasks/covers, hand sanitizers, and frequent hand washing as preventive measures during pandemic of 2019-nCoV. We conducted this study to observe the proportion of different dermatological manifestations due to these preventive measures during pandemic of Covid-19 in central India.

We adopted an observational cross-sectional study design for a duration of 1 month. We screened 3031 patients/HCWs coming to dermatology OPD for taking protective measures as disease prevention while Covid-19 pandemic. Only those patients or HCWs coming to dermatology department with minimum 4 h/day use of any kind of preventive masks and/or more than 8 times/day use of any hand hygiene product to avoid viral infection were included in study. Pediatric age group up to 14 years (due to nonreliable usage of such measures in children) and preexisting psychiatric illnesses (as per medical history) were excluded from the study. In suspected cases of obsessive-compulsive disorder, psychiatric evaluation was done before exclusion from study.

Every selected candidate was evaluated for proper and regular usage of preventive measures. They were asked for any new dermatological disease or increase in existing dermatoses/dermatitis/atopy after they started using preventive measures and for their temporal correlation with such measures. Mean, standard deviation, range, proportion, and Chi-square test were calculated using MS-Excel 10 and EpiInfo-7.

Among all the screened candidates, 1167 cases were using regular protective measures out of which 636 were males and 531 were females (male to female ratio 1.2:1). Average age of patients was 36.82 ± 15.02 years (range: 15–86 years). 903 cases were using mask/face-cover regularly (minimum 4 h/day) and 656 were using hand hygiene products more often during pandemic. Different types of masks like N-95 mask, surgical disposable masks, washable surgical masks, face-covers, handkerchiefs, etc., were used. Reused or un-tidy masks/face-covers were observed in 635 of 903 users (70.3%). Hand hygiene products included hand sanitizers, soaps, hand washes, etc., A total of 211 cases have developed symptomatic dermatological conditions (18.1%, n = 211/1167). Problems related to masks were present in 12.7% cases of total users (n = 115/903) and problems related to hand hygiene products were evident in 14.6% of regular users (n = 96/656). Overall burden of dermatological symptoms by masks was 54.5% (115/211) and due to hand hygiene products was 45.5% (n = 96/211). Distribution of these dermatoses among general population and HCWs are included in Table 1.

Hand dryness was the most common complaint noticed due to the frequent use of sanitizers and hand washes/soaps (n = 79/211, 36.2%) [Figure 1a]. New onset/precipitation of preexisting hand allergic contact dermatitis (ACD/eczema) and irritant contact dermatitis (ICD) were noticed in 13 cases (6.2%) and 3 cases (1.4%), respectively [Figure 1b]. One of these patients reported irritant contact dermatitis due to application of alcohol-based hand sanitizer (ABHS) over the face.

Irritation or erythema over face due to long exposure to facemask/cover were

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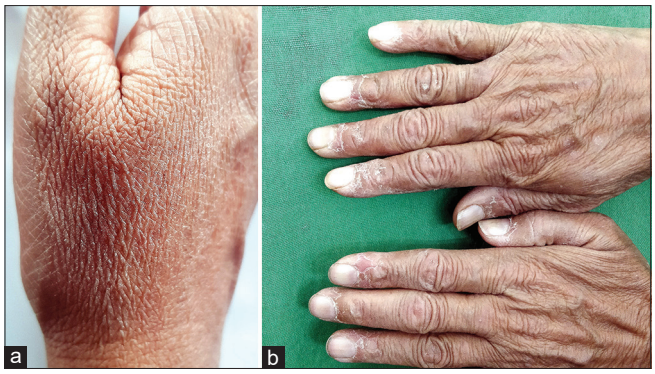

Figure 1: (a) A 35-year-old male having xerosis since 15 days with history of >15 times use of sanitizer. (b) A 41-year-old male with new onset allergic contact dermatitis due to frequent hand wash usage

Table 1: Dermatological conditions due to preventive measures and their frequency during pandemic

Dermatological conditions	General population	Health care workers	Total affected individuals
Hand dryness	29	50	79
Irritation/Erythema over face	18	29	47
Aggravation of Acne	24*	17	41
Eczema/ACD	2	11	13
Folliculitis/Furuncle	3	9	12
Miliaria	1	5	6
ICD	2	2	4
Koebnerization of MC	2	1	3
Tinea faciei	3	0	3
IBR	3	0	3
Total	87	124	211

*P=0.0121, Chi-square test, df=1

noticed in 47 cases (22.3%) most commonly over nasal bridge (n = 36/47, 76.6%) followed by post-auricular area (n = 32/47, 68.1%) and malar area (n = 21/47, 44.7%). New-onset/increase in acne over the mask area was evident in 41 cases (19.4%) [Figure 2 and 3]. We noticed folliculitis/furuncle in 12 patients (5.7%), miliaria in 6 patients (2.8%), koebnerization of preexisting molluscum contagiosum lesions in 3 patients, extension of tinea faciei lesions near the area touched by mask in 3 patients, and insect bite reaction (IBR) in 3 patients (1.4% each) [Figure 4a-d]. Dermatoses like hand dryness, irritation/erythema, ACDs, folliculitis, and miliaria were more in HCWs than in general population. We found significantly more number of acne aggravations due to preventive measures used during pandemic among the general population compared to other skin manifestations (P = 0.0121, Chi-square test) [Table 1].

Dryness due to hand hygiene products was commonest among all conditions (36.2%) followed by ACD and ICD (6.2% and 1.4%, respectively). There is depletion of the lipid barrier due to lipid-emulsifying detergents and lipid-dissolving alcohols. Such changes can lead to

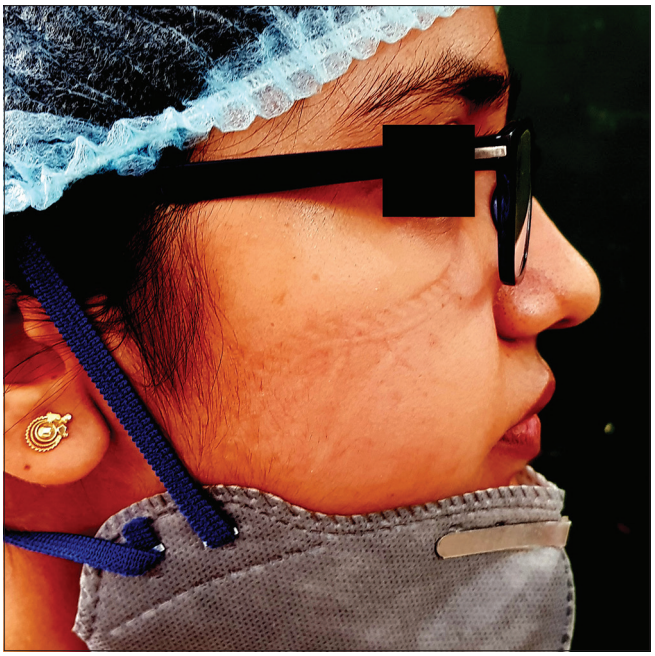

Figure 2: A 26-year-old female healthcare worker complains of itching, irritation, and mild erythema over tightly fit N-95 mask area

xerosis and further development of irritant and allergic contact dermatitis which has major impact on their regular use.[1,2] ABHS contain ethanol (60%–85%), isopropanol (60%–80%), or n-propanol (60%–80%) along with humectants (e.g., glycerin), emollients or moisturizers (e.g., aloe-vera) to prevent hand dryness caused by the alcohol.[3,4] The lipid-dissolving effect of alcohols, which leads to dryness, is inversely related to their concentration.[5] Soaps generally used in India are toilet soaps with high alkaline pH ranging from 9 to 10 which increases dehydrative effect of hand wash.[6]

Allergic reactions to hand hygiene products may present as delayed-type reactions (allergic contact dermatitis) or less commonly as immediate reactions (contact urticaria). Commonest causes of contact allergies are fragrances and preservatives, with emulsifiers being less common.[1] Due to lack of awareness and resources, people have been using face-covers, handkerchiefs, disposable clothed masks, and hand-made masks. In our study, 70.3% of mask-users were using reused masks which can contribute to some of the facial dermatoses. Because most of the population was not using tightly fit surgical masks or repeated readjustment/removal of masks, irritation/erythema due to mask was seen only in 5.2% cases (n = 47/903), while it was as common as 51.4% in Foo *et al.* study where N-95 masks were used.[7] High temperature and humidity are present inside the regular surgical masks.[8] Friction at mask area and at margins of mask, protruded wire of nose-bridge in reused masks, and stretch by elastic cords in retroauricular area contribute to irritation or erythema. Irritation/erythema over face was seen in 22.3% cases which is second most

Figure 3: A 21-year-old female health care worker using regular surgical mask developing sudden exacerbation of acne

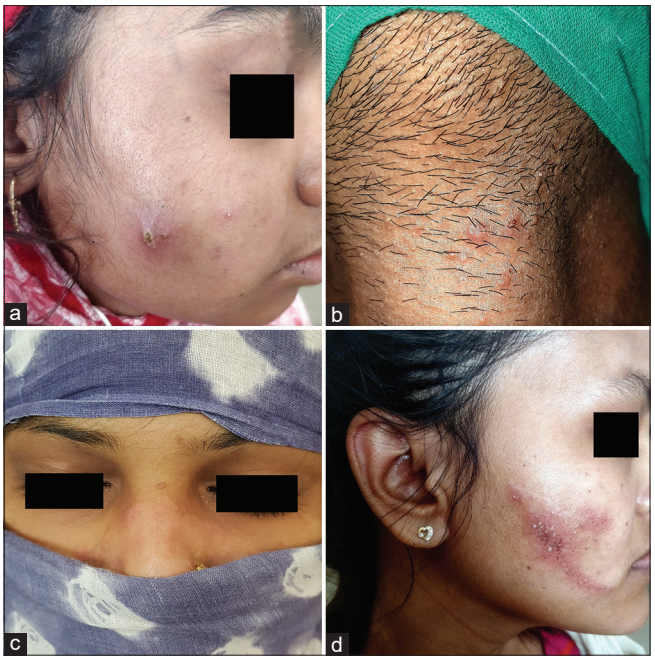

Figure 4: (a) A 19-year-old female using plain cloth as mask (without washing regularly) developed furuncle. (b) A 22-year-old male healthcare worker having Koebnerization of molluscum over mask area. (c) A 28-year-old female having tinea cruris, developed tinea faciei after starting face covers for long durations. (d) A 16-year-old female with insect bite reaction spread over mask region

common condition seen in sample population. Nasal bridge was most commonly affected site here (76.6%) which was in correspondence with observations of Lan *et al.* (83.1%).[9]

Increase humidity and temperature within the mask area, occlusion of pilosebaceous ducts by localized pressure of masks, along with stress due to pandemic can lead to exacerbation of preexisting acne or can lead to new onset of acne.[7] In our study, acne constituted 19.4% of total dermatoses. Due to such localized humidity/temperature, 2.8% of total affected cases presented with miliaria rubra over mask covered area in our study. Reuse of mask, improper unhygienic handling, and repeated touch exposes the facial skin to bacterial flora. Increase in temperature/humidity, unhygienic handling, and friction can lead to development or exacerbation of different skin diseases on face mainly folliculitis/furunculosis.[10] In our study, 5.7% cases were having these bacterial infections. Repeated friction by masks can explain cases of tinea faciei (n = 3) and koebnerization of molluscum contagiosum (n = 3) in our study.[11] We also noted three IBRs which can be due to insect bites/crush over tightly fit mask region, while it could also be a coincidental finding.

Although it is preclusive and highly recommended to use preventive measures in the continuance of Covid-19 pandemic, surmise of some dermatological conditions due to such measures is pertinent for physicians to know. Facemasks and hand hygiene products are most commonly used measures and our article highlights their effect from dermatologist's point of view.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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