

### Conflicts of Interest

C. Cassius state no conflict of interest; L Frumholtz state no conflict of interest; A de Masson state no conflict; O Dadzie state no conflict of interest; A. PETIT state no conflict of interest.

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## Adverse skin reactions related to PPE among healthcare workers managing COVID-19

To the Editor,

The current COVID-19 pandemic has taken a massive toll on healthcare workers (HCWs).<sup>1</sup> In order to mitigate the virus spread, HCWs are bound to adopt stringent preventive measures such as hand hygiene practices and use of personal protective equipments (PPE) in the form of protective masks, gloves, gowns, goggles or face shield, and respirators (i.e. N95 or FFP2 standard or equivalent) which make them susceptible to several adverse skin reactions.<sup>2</sup> We herein report PPE-related skin

reactions and associated risk factors observed among healthcare workers managing COVID-19.

An online questionnaire was distributed using Google Forms, after approval from institutional ethics committee, from 5 November to 5 December 2020, to all the doctors and nurses working in GMCH Chandigarh, India. Univariate and multivariate analysis were performed to assess associations between adverse skin reactions and the various variables. A total of 750 healthcare workers were administered the questionnaire out of which 503 participated in the study with a response rate of 67%. Out of the total, 308 (61.2%) participants were female, 194 (38.6%) males and 1 transgender. 395 (78.5%) participants were doctors, and 108 (21.5%) were staff nurses. 489 (97.21%) participants reported self-perceived adverse skin reactions after using PPE. This was consistent with previous studies reporting this rate between 70 and 97%.<sup>3–5</sup> Of note, this rate was staggeringly higher than what was reported before this pandemic (20–50%).<sup>6</sup> The most commonly affected site was nose (76%) followed by cheeks (61.1%), hands (49.8%), chin (8.1%) and neck (4.4%). Erythema was the most commonly reported sign (67%) followed by maceration (21%), exfoliation (17.3%) and acne (7.3%). Dryness (46%) and itching (45%) were the most common symptoms (Table 1). These clinical findings were in accordance with the findings of the previous studies.<sup>4,7–9</sup> A high frequency of nose lesions accounted to PPE use has been reported previously in studies.<sup>4,7,8</sup> Subjects working for >6 hours per day had higher

**Table 1** Clinical characteristics of self-perceived adverse skin reactions (*n* = 503)

Clinical features	No of participants (Percentage)
<b>Symptoms</b>	
Dryness	233 (46.3%)
Itching	228 (45.3%)
Pain	160 (31.8%)
<b>Signs</b>	
Redness	338 (67.2%)
Erosions/ ulcer	114 (22.7%)
Maceration	107 (21.3%)
Desquamation	87 (17.3%)
Fissures	87 (17.3%)
Acne	87 (17.3%)
<b>Affected sites</b>	
Nose	371 (75.8%)
Cheek	299 (61.1%)
Hands	244 (49.8%)
Chin	40 (8.1%)
Neck	22 (4.4%)
Trunk	02 (0.4%)
Axilla	01 (0.2%)
Groin	05 (1%)

**Table 2** Analysis of variables associated with self-perceived adverse skin reactions

Variables		Self-perceived adverse skin reaction	Univariate analysis		Multivariate analysis	
			OR (95% CI)	P value	OR (95% CI)	P value
Gender	Female	299 (61.2%)	0.86 (0.28–1.83)	0.891	–	–
	Male	189 (38%)				
Age	<30 years	329 (68.4%)	0.77 (0.43–1.65)	0.524	–	–
	≥30 years	150 (31.6%)				
Designation	Doctor	390 (78.5%)	2.34 (1.32–3.97)	<0.001	1.68 (0.90–1.99)	0.062
	Nurse	98 (21.5%)				
Duty hours per day	≤6 h	160 (36.6%)	3.23 (2.18–5.39)	<0.001	2.87 (1.10–6.86)	0.038
	>6 h	310 (63.4%)				
Duration of using PPE	≤6 h	295 (61%)	0.80(0.38–1.66)	0.411	–	–
	>6 h	191 (39%)				
Duration of using N95 mask beyond duty hours	≤6 h	273 (58.2%)	0.95 (0.56–1.82)	0.145	–	–
	>6 h	202 (41.8%)				
History of pre-existing chronic dermatosis		86 (17.5%)	1.73 (0.94–2.20)	0.083	0.93 (0.44–1.42)	0.672
History of hyperhidrosis		170 (35%)	0.91 (0.56–1.82)	0.152	–	–
Oily/ acne-predisposed skin		254 (51.7%)	2.57 (1.32–4.67)	0.0016	1.68 (0.90–2.89)	0.082
Routine use of moisturizer or emollients	Occasionally	105 (22.3%)	2.09(1.33–3.54)	0.008	1.01 (0.90–1.34)	0.067
	Rarely or never	310 (64%)				
	Regularly	60 (13.7%)				
Recent switch to antiseptic soap or hand wash		91 (19.3%)	1.09(0.33-3.54)	0.012	1.11 (0.80–1.32)	0.07
Use of alcohol-based sanitizers in daily routine	Frequently	373 (75.5%)	1.89(1.13–3.33)	0.001	1.01 (0.90–1.34)	0.067
	Never	3 (0.8%)				
	Occasionally	111 (23.7%)				
Frequency of hand washing	<10 times per day	200 (40.2%)	0.78 (0.46–1.72)	0.132	–	–
	>10 times per day	292 (59.8%)				
Designated work area	General ward	201 (41.2%)	2.11(1.13–3.53)	0.015	1.01 (0.90–1.34)	0.165
	SARI (Severe acute respiratory illness)/ isolation ward	149 (30.2%)				
	Screening/ fever clinic	40 (8.9%)				
	More than one	97 (19.7%)				

association with adverse skin reactions as per univariate analysis (Odds ratio (OR) 3.23,  $p < 0.001$ ) as well as multivariate analysis (Odds ratio [OR] 2.8,  $P = 0.038$ ) (Table 2). Pre-existing chronic dermatoses were reported in 88 subjects including acne (47%), atopic dermatitis (30.6 %) and hand eczema (21%); however, no significant association was found with new-onset skin lesions accounted to PPE use. In contrast, previous studies have demonstrated either an increased incidence of dermatitis or an exacerbation of the pre-existing disease after use of PPE.<sup>9,10</sup> Other variables including oily/acne-predisposed skin, regular use of emollients, recent switch to antiseptic soap or hand wash, use of alcohol-based sanitizers in daily routine and posting in the severe acute respiratory

illness (SARI) ward were significantly associated with adverse skin reactions in univariate analysis but non-significant in multivariate analysis (Table 2).

It is pertinent to note that these skin reactions, albeit mild to moderate, are common and may be a constant source of irritation for HCWs, leading to repeated fiddling and contamination of PPE. Moreover, these may add to the mental burden of HCWs already combating this global health crisis. Simple yet effective behavioural changes may be adopted to alleviate these adverse effects such as regular use of moisturizers for hands and avoidance of overzealous use of alcohol-based sanitizers, use of non-comedogenic emollients for face, preference of face shields over goggles, wearing a simple surgical mask under N95,

moderate pinching of the metal clip and the use of soft foams or silicon tapes under the mask. Further, provision of ergonomically designed PPE and reasonable working hours per shift on administration level may improve the PPE adherence and work efficiency of the frontline HCWs.

The limitations of this study include inability to validate the perceived adverse skin reactions by participants and evaluate the severity of these reactions. Nevertheless, this study provides some insight into incidence and risk factors of adverse skin reactions to PPE and such information may prove beneficial to HCWs fighting COVID-19.

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## Transient cutaneous manifestations after administration of Pfizer-BioNTech COVID-19 Vaccine: an Italian single-centre case series

Dear Editor,

Numerous skin manifestations associated with COVID-19 infection have been reported so far.<sup>1–3</sup> They include vesicular or maculo-papular skin rashes, livedoid/necrotic lesions, urticaria, chilblains-like lesions and drug induced eruptions.<sup>1</sup>

Clinical trial results for BNT162b2 mRNA Covid-19 vaccine reported mild-to-moderate pain at the injection site within 7 days after administration, with severe pain in <1% of

**Table 1** Demographics, history and clinical features in 11 patients with cutaneous manifestations after vaccine receipt

N	Sex	Age	Vaccine dose	Onset	Clinical features	Extracutaneous manifestations	Allergy-related history
1	F	67	1°	1 day	Itchy erythematous-oedematous plaque at injection site	N	N
2	F	61	2°	2 days	Erythema & swelling of left foot dorsum	N	N
3	F	55	1°	8 days	Erythema and itch of face	Y	Y
4	F	59	2°	3 days	Diffuse erythematous rash	Y	Y
5	F	62	1°	1 h	Itchy erythematous-oedematous plaque at injection site	Y	Y
6	F	38	1°	1 h	Erythema of both legs	Y	Y
7	M	56	1°	1 h	Urticaria at injection site	N	Y
8	F	56	2°	5 h	Diffuse erythematous rash of trunk	N	Y
9	M†	29	1°	7 days	Erythema and swelling of left chest	N	Y
10	M	36	2°	48 h	Diffuse erythematous rash of trunk	N	N
11	M	32	1°	2 days	Urticarial rash, flare-up of atopic dermatitis	N	Y

F, female; M, male; N, No; Y, yes.

†Previous SARS-CoV-2 infection.