

## Skin damage among health care workers managing coronavirus disease-2019



*To the Editor:* Since the outbreak of coronavirus disease-2019 (COVID-19) in December 2019, more than 200,000 health care workers from all over China have been participating in the fight against this highly contagious disease in Hubei province, which is the center of infection in China. Skin damage caused by enhanced infection-prevention measures among health care workers, which could reduce their enthusiasm for overloaded work and make them anxious, has been reported frequently.

Previous studies have revealed that hand eczema is quite common in health care workers,<sup>1,2</sup> and the risk factors include frequent hand hygiene and wearing gloves for a long time.<sup>3,4</sup> Considering the frequent hand hygiene and long-time wearing of tertiary protective devices (N95 mask, goggles, face shield, and double layers of gloves) among health care workers during the epidemic period of COVID-19, we aimed to estimate the prevalence, clinical features, and risk factors of this skin damage among them.

From January to February 2020, self-administered online questionnaires were distributed to 700 individuals, consisting of physicians and nurses who worked in the designated departments of tertiary hospitals in Hubei, China. The questionnaire included questions about the condition of skin damage and the frequency or duration of several infection-prevention measures (Supplemental Material 1, available via Mendeley at <https://data.mendeley.com/datasets/zknvry83v5/2>). Finally, 542 individuals (Supplemental Material 2) completed the study (response rate, 77.4%), with 71.4% (387 of 542) working in isolation wards and 28.6% (155 of 542) working in fever clinics.

The general prevalence rate of skin damage caused by enhanced infection-prevention measures was 97.0% (526 of 542) among first-line health care workers. The affected sites included the nasal bridge, hands, cheek, and forehead, with the nasal bridge the most commonly affected (83.1%). Among a series of symptoms and signs, dryness/tightness and desquamation were the most common symptom (70.3%) and sign (62.2%), respectively (Table I). The health care workers who wore some medical devices more than 6 hours had higher risks of skin damage in corresponding sites than those who did for less time (N95 masks: odds ratio [OR], 2.02; 95% confidence interval [CI], 1.35-3.01;  $P < .01$ ; goggles: OR, 2.32; 95% CI, 1.41-3.83,  $P < .01$ ), whereas a longer time of wearing a face shield was not a

**Table I.** Clinical features of skin damage among first-line health care workers

Clinical features*	Participants with skin damage (N = 526), No. (%)
Symptoms	
Dryness/tightness	370 (70.3)
Tenderness	299 (56.8)
Itching	276 (52.5)
Burning/pain	200 (38.0)
Skin lesions	
Desquamation	327 (62.2)
Erythema	260 (49.4)
Maceration	210 (39.9)
Fissure	204 (38.8)
Papule	173 (32.9)
Erosion and ulcer	53 (10.1)
Vesicle	7 (1.3)
Wheal	2 (0.4)
Site	
Nasal bridge	437 (83.1)
Cheek	414 (78.7)
Hands	392 (74.5)
Forehead	301 (57.2)

\*With overlaps.

significant risk factor in causing forehead skin damage (OR, 1.52; 95% CI, 0.93-2.50;  $P = .66$ ). The more frequent (>10 times daily) hand hygiene could increase the risk of hand skin damage (OR, 2.17; 95% CI, 1.38-3.43;  $P < .01$ ), rather than a longer time of wearing gloves (Table II).

Our study has some limitations. Firstly, we only studied 1 site with a single exposure factor, but some sites could be related to more than 1 factor. The nasal bridge, for example, could be compressed by the N95 mask and goggles simultaneously, although goggles were the main factor. Secondly, possible risk factors such as participants wearing the N95 mask after work in daily life were not included.

In conclusion, our study demonstrated that the prevalence of skin damage of first-line health care workers was very high. Moreover, we found that longer exposure time was a significant risk factor, which highlights that the working time of first-line staff should be arranged reasonably. Besides, prophylactic dressings could be considered to alleviate the device-related pressure injuries, according to a prior study.<sup>5</sup>

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**Table II.** The association between skin damage and related exposure factors

Infection-preventive measures	Participants, No.	Variables	Participants (N = 526), No. (%)	Participants with skin damage in related sites, No. (%)	OR	95% CI	P
N95 mask	542	≤6 h/d	225 (41.5)	Cheek: 155 (68.9)	1	[Ref]	
		>6 h/d	317 (58.5)	Cheek: 259 (81.7)	2.02	1.35-3.01	<.01
Goggles	451	≤6 h/d	186 (41.2)	Nasal bridge: 141 (75.8)	1	[Ref]	
		>6 h/d	265 (58.8)	Nasal bridge: 233 (87.9)	2.32	1.41-3.83	<.01
Face shield	265	≤6 h/d	108 (40.8)	Forehead: 52 (48.1)	1	[Ref]	
		>6 h/d	157 (59.2)	Forehead: 92 (58.6)	1.52	0.93-2.50	.66
Gloves	113*	≤6 h/d	52 (46.0)	Hands: 29 (55.8)	1	[Ref]	
		>6 h/d	61 (54.0)	Hands: 39 (63.9)	1.41	0.66-3.00	.44
	321 <sup>†</sup>	≤6 h/d	131 (40.8)	Hands: 100 (76.3)	1	[Ref]	
		>6 h/d	190 (59.2)	Hands: 146 (76.8)	1.03	0.61-1.74	>.99
Hand hygiene	434	≤10 times/d	113 (26.0)	Hands: 68 (60.2)	1	[Ref]	
		>10 times/d	321 (74.0)	Hands: 246 (76.6)	2.17	1.38-3.43	<.01

CI, Confidence interval; OR, odds ratio; Ref, reference.

\*These participants are limited to those who wore double layers of gloves and washed hands 1-10 times/d.

<sup>†</sup>These participants are limited to those who wore double layers of gloves and washed hands >10 times/d.

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