

LETTER TO THE EDITOR

Risk factors for facial pressure sore of healthcare workers during the outbreak of COVID-19

Dear Editors,

The coronavirus disease 2019 (COVID-19) has been reported in almost all continents. Globally, more than 6 million confirmed cases of COVID-19 have been reported.¹ Adequate personal protective equipment (PPE) supply plays a pivot role in preventing infection in healthcare workers. However, PPE-related dermal conditions, especially on face, has brought up concerns in healthcare workers due to long-hour contact,² but without targeted research in the era of this pandemic so far. Therefore, we described the common facial dermal conditions and identified the risk factors of the facial skin pressure sores of healthcare workers during the COVID-19 outbreak in China.

We designed a questionnaire (approved by Ethics Committee of Beijing Tsinghua Changgung Hospital) to investigate the influence of PPE on facial skin conditions among healthcare workers during the COVID-19

outbreak. The key variables in the questionnaire included age, gender, PPE type, daily contact hours, cumulative contact hours, skin condition type, sequelae etc. We conducted the survey among healthcare workers in two cities, Wuhan and Beijing, who serviced in the COVID and non-COVID unit, by means of social communication apps and emails. Upon response, the participants were divided into two groups, pressure sore positive group and negative group.

We distributed 120 questionnaires and collected 102 effective responses with a median age of 31 (range 25-55) years old. Forty-two (41.2%) of were male and 59 (57.8%) were physicians. Seven-eight (76.5%) healthcare workers serviced in the frontline containing COVID-19, others managed the routine medical work. Majority (90.2%) of them reported new onset of facial skin conditions following PPE contact, such allergic contact dermatitis (30.4%), eczema (18.6%), folliculitis (11.8%), and pressure sore (60.8%). Meanwhile, the common sequelae were pigmentation (39.2%), redness (35.3%), desquamation (14.7%) and itching (13.7%). The pressure sore positive group has 62 (60.8%) responders, among which 51 stage I, 11 stage II, and above, while pressure sore negative group has 40 ones (Figure 1). We compared the clinical features and risk factors between two groups (Table 1). The results showed that healthcare workers wearing goggle (55/62 versus 26/40, $P = .001$), N95 mask (61/62 versus 28/42, $P < .001$) and hairnet (60/62 versus 27/42, $P < .001$), and servicing in the COVID unit (56/62 versus 22/42, $P < .001$) in the pressure sore positive group outnumbered the negative significantly. Regarding N95 mask, daily contact time (6 versus 4 hours, $P < .001$) and cumulative contact time (132 versus 76 hours, $P = .009$) were much longer in the pressure sore positive group. Multivariable logistic regression analysis showed that servicing in the COVID-19 unit (OR 4.40, 95% CI 1.33-14.55, $P = .015$) and prolonged N95 mask contact (OR 1.273, 95% CI 1.07-1.52, $P = .006$) were independent risk factors for facial pressure sore of healthcare workers.

Facial skin conditions by prolonged PPEs contact have impacted the wellbeing of frontline healthcare workers. Pressure sore, skin allergic reactions, eczema,

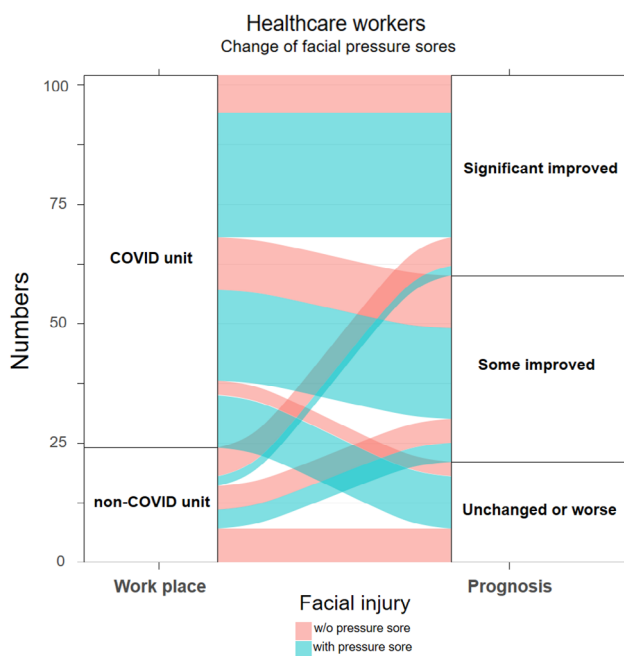


FIGURE 1 The diagram for the change of healthcare workers with facial pressure sores

TABLE 1 The comparison of characteristics in the healthcare workers between pressure sore positive and negative groups

	Positive (n = 62)	Negative (n = 40)	Unadjusted <i>P</i> value	Adjusted <i>P</i> value	OR (95% CI)
Gender (male, %)	29 (46.8)	13 (32.5)	.216		
Age (median, range, y)	31.5 (25-55)	30 (25-48)	.119		
Occupation (physician, %)	34 (54.8)	25 (62.5)	.794		
Work place (COVID, %)	56 (90.3)	22(55.0)	<.001	.015	4.40 (1.33-14.55)
PPE (yes, %)					
Ordinary glasses	39 (62.9)	22 (55.0)	.535		
Goggle	55 (88.7)	24 (60.0)	.001	.868	
N95 mask	61 (98.4)	28 (70.0)	<.001	.370	
Surgical mask	47 (75.8)	35 (87.5)	.203		
Hairnet	60 (96.8)	27 (67.5)	<.001	.252	
Face shield	9 (14.5)	1 (2.5)	.084		
Work time (median, range, h)					
Daily N95 mask contact time	6 (0-17)	4 (0-12)	<.001	.006	1.27 (1.07-1.51)
Daily Surgical mask contact time	6 (0-17)	6 (0-15)	.986		
Cumulative N95 mask contact time	132 (0-600)	76 (0-396)	.009	.781	
Cumulative surgical mask contact time	124 (0-600)	178 (0-600)	.391		
Working days (median, range, d)	24.5 (2-60)	32.5 (2-60)	.101		

Abbreviations: PPE, personal protective equipment.

and folliculitis-like damage were the main facial skin problems. Pressure sore is pressure-related injury associated with PPEs. The common affected areas were pressure-bearing points including nasal bridge (52.0%), zygomatic arch (45.1%), and auricles (22.6%). PPEs have low breathability, which reduce comfortability and increase perspiration. Exhaled water vapour is a double whammy, which further increases humidity around facial skin. An international consensus in 2015 recommends that the effective protection against pressure includes reduced bearing time and preventive dressing (e.g. alginate and hydrocolloid) over vulnerable skin sites.³


Our investigation showed, working in the COVID unit was confirmed to have a strong correlation with pressure sore. A set of PPEs, including hairnet, goggle, N95 mask, and coverall suits, in the COVID unit may induce a detrimental combination of pressure, friction, shearing forces, and moisture.⁴ The result from our study proved that prolonged N95 use increased the chance of suffering pressure sore. However, due to the scarcity of PPE and healthcare workers among the global, proper preventive dressing is an alternative when working in the COVID unit.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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