
DERMATOLOGIC PROBLEMS AMONG HEALTHCARE WORKERS DURING COVID19 PANDEMIC

Tsvetana Abadjieva

Department of Dermatology and Venereology, Medical Faculty, Medical University of Plovdiv, Bulgaria,
ts_abadjieva@yahoo.com

Donka Brambarova

Department of Dermatology and Venereology, Medical Faculty, Medical University of Plovdiv, Bulgaria,
d.brambarova@abv.bg

Abstract: Coronavirus disease 2019, officially named COVID-19 by World Health Organization, emerged in December 2019, in Wuhan city, China, with clinical manifestation of severe acute respiratory syndrome coronavirus -2 (SARS-CoV-2). The disease caused by SARS-Co-2 is highly contagious. Coronavirus infection is rapidly spreading and changing the world. This is an exceptional challenge for healthcare workers, especially those on the frontline. They must use proper personal protective equipment when exposed to a patient with suspected or confirmed COVID-19 or other sources of SARS-Cov-2. The necessary equipment includes: gloves, gowns, hazmat suits, eye and face protection like face shields, face masks (medical and fabric), goggles, and others, according to WHO instructions. Reports on dermatologic problems among medical personnel are constantly increasing in connection with the frequent use of detergents and sanitizers and the prolonged wearing of personal protective equipment during the COVID-19 pandemic. Skin manifestations include burning, pruritus, pain, erythema, scales, vesicles, maceration, erosions, and in chronic cases, hyperkeratosis, lichenification, fissures. Different types of skin reactions occur in medical professionals, such as pressure dermatitis caused by wearing masks, helmets, contact irritant or allergic dermatitis of the hands, hyperhidrosis, bacterial infections, acne caused by wearing face masks. The prolonged wearing of personal protective equipment is possible to cause exacerbation of pre-existing skin conditions like xerosis cutis, seborrheic dermatitis, acne, urticaria. The influence of stress as an aggravating factor in some conditions is taken into account. Skin problems caused by prolonged wearing of personal protective equipment, although not representing life threatening conditions, interfere with the work of health professionals, have a significant impact on emergency management, reduce work performance, create emotional discomfort and may cause temporary disability. Early recognition of the first cutaneous manifestations is important in order to avoid severe conditions in healthcare workers. The prevention of dermatologic reactions is discussed. Healthcare professionals should be encouraged to take measures to protect their skin, at least by frequently using moisturizers, protective creams, especially after hand washing and before applying protective equipment. In conclusion, it is important that dermatologists and other healthcare professionals be aware about the occupational dermatologic reactions in healthcare workers during COVID-19 pandemic

Keywords: COVID-19, healthcare workers, protective equipment

1. INTRODUCTION

In December 2019, the first pneumonia cases of unknown origin were identified in Wuhan, Hubei Province, People's Republic of China (PRC). After analysis of respiratory samples, the pathogen was identified as a novel coronavirus. The World Health Organization (WHO) officially named the disease Coronavirus disease – 2019 (COVID - 19) (Sohrabu, et al, 2020). The International Committee on Taxonomy of Viruses named the virus “severe acute respiratory syndrome coronavirus 2” (SARS-CoV-2). The virus is a member of the β -coronavirus family, a large class of viruses that are widespread in nature. The virus has many potential natural hosts, and this poses a great difficulty for prevention of the infection (Wang et al, 2020; Zhou et al, 2020). SARS-CoV-2 may have higher transmissibility and contagiousness, and lower mortality rate compared with Middle East respiratory syndrome coronaviruses (Liu, Gayle, Wilder-Smith & Rocklov, 2020; Huang et al, 2000). Coronaviral infection is rapidly spreading and changing the world. This is an exceptional challenge for healthcare workers, especially those on the frontline.

2. PREVENTION OF COVID-19 AND DERMATOLOGIC PROBLEMS AMONG HEALTHCARE WORKERS DURING COVID-19 PANDEMIC

Healthcare delivery and support staff (hospital staff who enter patients' rooms) exposed to known or suspected COVID-19 patients, medical transport workers moving known or suspected COVID-19 patients in enclosed vehicles are at high exposure risk. Healthcare workers (doctors, nurses, dentists, paramedics, emergency medical

technicians), healthcare or laboratory personnel collecting or handling specimens from known or suspected COVID-19 patients, morgue workers performing autopsies are at very high exposure risk during the coronavirus pandemic. The number of coronavirus-infected healthcare workers is constantly increasing.

Therefore, prevention of healthcare workers is extremely important. Frequent hand washing, use of sanitizers, prolonged wearing of personal protective equipment are necessary during the COVID-19 pandemic. The use of proper personal protective equipment when coming in contact with a patient with suspected or confirmed COVID-19 or other sources of SARS-Cov-2 is of utmost importance. The protective equipment includes: gloves, isolation gowns, hazmat suits, eye and face protection, such as filtering facepiece respirator, face shields, face masks (medical and fabric), goggles, and others, according to the WHO Guidelines on Hand Hygiene in Health Care (2009) and the WHO interim guidance for healthcare workers (2020, February 27; 2020, June 5).

Reports on dermatological problems among medical personnel are constantly increasing in connection with the frequent use of detergents and sanitizers and the prolonged wearing of personal protective equipment during the COVID-19 pandemic. The first publications about skin damage in healthcare personnel came from China.

Skin manifestations include burning, pruritus, pain, erythema, scales, vesicles, maceration, erosions, and in chronic cases, hyperkeratosis, lichenification, fissures. The most common signs are dryness, tightness and desquamation. The affected areas of the skin include hands, nose, cheeks, and forehead.

Frequent washing of hands increases the risk of skin damage. Healthcare professionals who wear protective equipment for longer time have skin injuries more frequently. It was reported that the most frequently affected skin site was the nasal bridge and wearing protective equipment for more than 6 hours increases the risk of skin damage in corresponding areas (Lan et al, 2020).

Different types of skin reactions occur in medical professionals, such as pressure dermatitis caused by wearing face masks, helmets, dry skin, contact irritant or allergic dermatitis of the hands, hyperhidrosis, bacterial infections, acne caused by wearing face masks. The prolonged wearing of personal protective equipment is possible to cause exacerbation of pre-existing skin conditions like xerosis cutis, seborrheic dermatitis, acne, urticaria.

Hand hygiene products

Hand hygiene products are various: liquid or bar soaps, synthetic detergents, antiseptic handwashers, and alcohol-based hand sanitizers. They are effective against SARS-CoV-2 but they may alter the cutaneous barrier integrity and function, increasing the risk of hand dermatitis. Hand hygiene products can cause loss of surface lipids due to lipid-emulsifying detergents and lipid-dissolving alcohols (Rundle et al, 2020).

More frequent hand washing and a lower frequency of moisturizer use are predisposing factors leading to an imbalance and increased risk of contact dermatitis of the hands. A survey established that 66.1% of healthcare workers wash their hands over 10 times per day, but only 22.1% took protective skincare measures after washing (Yan et al., 2020). Irritant contact dermatitis is a common problem. A multicentre audit in the UK and Ireland established that the commonest diagnosis among healthcare workers during the COVID-19 pandemic is irritant contact dermatitis (59%) (O'Neill & Kiely, 2020).

The ingredients in hand hygiene products can cause allergic contact dermatitis. The hand hygiene components reported to cause allergic contact dermatitis are: preservatives, surfactants, and antimicrobial ingredients. Alcohol-based hand sanitizers may also contain allergens, including glycol and fragrances (Rundle et al, 2020).

Facemasks

N95 masks were recommended by the Centers for Disease Control and WHO for healthcare workers caring for suspected or confirmed SARS patients (Foo et al, 2006).

Adverse skin side effects were most commonly reported from prolonged wearing of N95 mask. Among 61 healthcare workers who regularly used N95 mask, 91.1% reported adverse reactions, including nasal bridge scarring (68.9%), facial itching (27.9%), skin damage (26.2%), dry skin (24.6%), rash (16.4%), 7 workers had indentation and ear pain, 1 had acne, 6 had wheals on the bridge of the nose, jaw, and cheeks. The workers developed these reactions after using the N95 mask for 12 hours a day over an average of 3.5 months. The workers using surgical masks, cloth masks, and paper masks did not report any adverse skin reactions. The proportion of affected women was significantly higher than that of men (Hu et al, 2020).

Surgical masks and N95 masks, goggles and face shields have been reported to cause contact dermatitis typically behind the ears (from elastic straps), on the bridge of the nose, or rarely on the entire face (Desai et al, 2020).

In a self-report questionnaire survey in China it was found that 85.4% had facial skin problems, 17.1% reported respiratory tract problems, and 6.2% had eye symptoms. Of all investigated healthcare workers, 45.0% admitted touching the mask surface occasionally owing to discomfort, and 8.9% removed their masks because they could not tolerate it (Zuo, Hua, Luo, & Li, 2020).

The adverse reactions of wearing facemasks in 250 healthcare workers were: excessive sweating around the mouth, difficulty in breathing on exertion, acne, and itchy nose (Purushothaman, Priyanga & Vaidhyswaran, 2020).

Latex gloves

Among 61 workers who regularly used latex gloves, 88.5% reported adverse skin reactions: dry skin (55.7%), itching (31.2%), rash (23.0%), chapped skin (21.3%), 3 had skin soaked with sweat, and 1 had symptoms of edema (Hu et al, 2020). No one reported that the use of plastic gloves can cause adverse skin reactions (Hu et al, 2020; Foo et al, 2006).

Protective clothing

Prolonged wearing of protective equipment leads to the appearance of adverse skin reactions. Of the 61 healthcare workers who regularly wore protective clothing, 60.7% reported adverse skin reactions: dry skin 36.1%, itching 34.4%, rash 11.5%, and wheals 3.28%. The protective clothing was worn for an average of 10 hours a day for an average of 3.5 months. All healthcare workers continued to use protective clothing regardless of symptoms (Hu et al, 2020).

The influence of stress as an aggravating factor in some conditions is taken into account. Skin problems caused by prolonged wearing of personal protective equipment, although not representing life threatening conditions, interfere with the work of health professionals, have a significant impact on emergency management, reduce work performance, create emotional discomfort and may cause temporary disability.

3. PREVENTION OF DERMATOLOGIC PROBLEMS AMONG HEALTHCARE WORKERS DURING COVID-19 PANDEMIC

Alcohol-based hand sanitizers are thought to be safer than detergents to the risk of irritant contact dermatitis because of lesser lipid dissolving effects. Qualified hand sanitizers using ethanol as the main ingredient should be used for hand decontamination.

Outside of work, foamless cleansing products containing moisturizing ingredients are recommended to reduce the damage of the skin barrier caused by soaps and other alkaline detergents (Yan et al., 2020).

Healthcare professionals should be encouraged to take measures to protect their skin, at least by using moisturizers, protective creams frequently, especially after hand washing and before applying protective equipment.

It is recommended that easily available makeup cotton pads be applied to prevent nose and cheek damage (pressure dermatitis) due to the use of N95 mask (Cabbarzade, 2020).

To prevent acne, washing the face with gentle, mild fragrance free, noncomedogenic cleanser is recommended in the morning and at the end of the day, and to take appropriate breaks from wearing a mask: 15 minutes off every 2 hours (Desai et al, 2020).

4. CONCLUSION

In conclusion, it is important that dermatologists and other healthcare professionals be aware about the occupational dermatologic reactions in healthcare workers during COVID-19 pandemic

REFERENCES

- Cabbarzade, C. (2020, July 17). A Practical Way to Prevent Nose and Cheek Damage Due to the Use of N95 Masks in the COVID-19 Pandemic. *Aesthetic Surgery Journal*, 1–3. DOI:10.1093/asj/sjaa167
- Desai, S.R., et al. (2020, August). COVID-19 and personal protective equipment: Treatment and prevention of skin conditions related to the occupational use of personal protective equipment. *Journal of the American Academy of Dermatology*, 83(2): 675-677. Retrieved from <https://doi.org/10.17632/y5f78b42s5.1>.
- Foo, C.C., Goon, A. T., Leow, Y.-H., & Goh, C.-L. (2006, July 9). Adverse skin reactions to personal protective equipment against severe acute respiratory syndrome – a descriptive study in Singapore. *Contact Dermatitis*, 55: 291–294.
- Hu, K., et al. (2020, May 7). The adverse skin reactions of health care workers using personal protective equipment for COVID-19. *Medicine*, 99:24(e20603). Retrieved from URL: <http://dx.doi.org/10.1097/MD.00000000000020603>
- Huang et al. (2020, February 24). Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *The Lancet*, 395(10223), 497-506
- Lan, J. et al. (2020, March 18). Skin damage among health care workers managing coronavirus disease-2019. *Journal of the American Academy of Dermatology*, 82, 1215-1216
- Liu, Y., Gayle, A. A., Wilder-Smith, A., Rocklov, J. (2020). The reproductive number of COVID-19 is higher compared to SARS coronavirus. *Journal of Travel Medicine*, 27(2), taaa021. Doi 10.1093/jtm/taaa021 – infectivity mortality
- O’Neill, H. & Kiely L. (2020, October 28). Occupational dermatoses during the Covid-19 pandemic: a

- multicentre audit in the UK and Ireland. *British Journal of Dermatology*, Retrieved from <https://doi.org/10.1111/bjd.19632>
- Purushothaman, P.K., Priyanga, E., & Vaidhyswaran, R. (2020, September 15). Effects of Prolonged Use of Facemask on Healthcare Workers in Tertiary Care Hospital During COVID-19 Pandemic. *Indian Journal of Otolaryngology and Head & Neck Surgery*, Retrieved from <https://doi.org/10.1007/s12070-020-02124-0>
- Rundle, C.V. et al. (2020, July 22). Hand hygiene during COVID-19. Recommendations from the American Contact Dermatitis Society, *Journal of the American Academy of Dermatology*, 83(6), 1730-1737 Retrieved from <https://doi.org/10.1016/j.jaad.2020.07.057>
- Sohrabu, C. et al. (2020, February 26). World health Organization declares global emergency: a review of the 2019 novel coronavirus (COVID-19). *International Journal of Surgery*, 76, 71-76
- Wang, L., Wang, Y., Ye, D., Liu, Q. (2020, March 19). Review of the 2019 novel coronavirus (SARS-CoV-2) based on current evidence. *International Journal of Antimicrobial Agents*, 55(6), 105948
- Who Guidelines on Hand Hygiene in Health Care: First Global Patients Safety Challenge Clean Care Is Safer care. Geneva: World Health Organization. (2009). 14, Skin reactions related to hand hygiene. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK144008/>
- World Health Organization (2020, February 27). Rational use of personal protective equipment for coronavirus disease 2019 (COVID-19): interim guidance. Retrieved from URL: WHO/2019-nCov/IPC_PPE_use/2020.1
- World Health Organization (2020, June 5). Advice on the use of masks in the context of COVID-19 Interim guidance. Retrieved from URL: WHO/2019-nCov/IPC_Masks/2020.4
- Yan, Y. et al. (2020). Consensus of Chinese expert on protection of skin and mucous membrane barrier for health-care workers fighting against coronavirus disease 2019. *Dermatologic Therapy*, 29: e13310
- Zhou, F. et al. (2020, March 28). Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. *The Lancet*, 395(10229), 1054-1062
- Zuo, Y., Hua, W., Luo, Y. & Li, Li. (2020, April 16), Skin reactions of N95 mask and medical mask among healthcare personnel: a self report questionnaire survey in China. *Contact Dermatitis*, 1-3