

Skin reactions to COVID preventative measures – cleansing agents & PPE

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Introduction

- COVID-19 & dermatitis from increased use of cleansing agents & hand sanitisers
 - Increases of occupational skin diseases due to cleansing agents – What is in the literature?
 - Possible causative agents –
 - Irritants - detergents, surfactants, iodine
 - Allergens – preservatives, fragrances, surfactants etc.
 - Poor hand care
- Skin reactions due to use of other protective measures
 - Gloves
 - Masks
 - Respirators

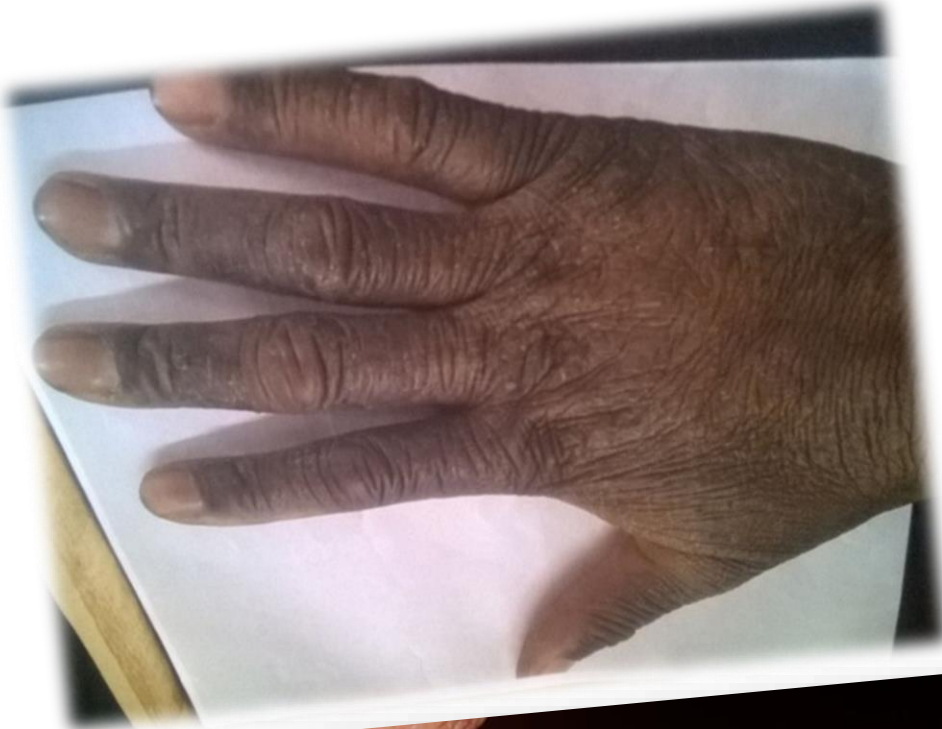
“A picture paints 1000 words”



Irritant Contact Dermatitis



Irritant Contact Dermatitis



Contact Urticaria



Allergic Contact Dermatitis



Location – Country /area	Population/ Study size	Skin damage reported	Prevalence
Hubei, China	542 hospital Physicians, nurses in tertiary hospitals	Hands	74,5%
Wuhan	376 Doctors & nurses in 5 University & 5 regional hospitals	Hands	84,6% among those who reported skin problems
Wuhan, China	330 HCW in clinics & in-patient wards	Skin barrier damage	71% overall
28 Provinces in China	4306 Medical staff in 161 hospitals	Moisture-associated skin damage (MASD)	10,8%
South Wales, UK	Observational case series from a district hospital in Wales (72 workers)	Irritant hand dermatitis Worsening of pre-existing dermatological conditions	62,5% 23,6%
London and Manchester, UK	2 NHS Foundation Trust clinics in England (146; 85 workers)	Hand dermatitis	35,3% 48,3%



Hand dermatitis & hand cleansers

- Data from the Occupational Skin Clinic at NIOH
 - 699 patients (2006-2016) - 327(46,9%) had hand dermatitis (HD)
- NIOH surveillance report for 2019
 - 28% of patients had hands as primary site of dermatitis
- COVID-19 pandemic - Increased frequency of hand cleansing
 - Sanitising or hand-washing for HCW & general public
 - Likely to result in an increase in the prevalence of hand dermatitis
- May 2020 to March 2021
 - 37 patients seen at NIOH skin clinic - 60% (22) presented with hand dermatitis
 - Anecdotal reporting from staff members (lab & other) of rash on hands



Skin Irritants

- Excessive use of water and soap (highly recommended protective measure against exposure to Covid-19 virus)
- Exaggerated hand washing with detergents/disinfectant
 - Penetration of foreign substances
 - Development of irritant and allergic contact dermatitis
 - Changes in the normal microbial flora in/on the skin
 - Supports the overgrowth of pathological organisms on the skin
- Even mild soaps containing alkyl sulphates (e.g. sodium lauryl sulphate) as major surfactants can be highly irritating
 - Lauryl glucoside and Cocamidopropyl betaine appear to be milder surfactants



Skin Irritants

- Surfactant residues in soap form a reservoir on the skin, even after rinsing with water
 - Small amounts are large enough to produce barrier impairment
- Use of hot water enhances the irritant effects by promoting greater absorption of the cleansers
- Other irritants include:
 - Chlorhexidine digluconate
 - Chloroxylenol [or para-chloro-meta-xyleneol (PCMX)]
 - Triclosan (anti-microbial)
 - Alcohol based hand sanitisers

Allergens in hand cleansers

Common contact allergens are:

- Quaternary ammonium compounds [e.g. benzalkonium chloride, cetrимide - biocides often used as disinfectants in hospitals]
- Iodine or iodophors (preparation containing iodine complexed with a solubilizing agent)
- Chlorhexidine (chlorhexidine digluconate) [IgE mediated reactions]
- Triclosan
- Chloroxylenol
- Alcohols (rarely)



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.....More allergens in hand cleansers

- Fragrances, surfactants and preservatives
 - Sodium benzoate
 - Cocamidopropyl betaine
 - Cocamide diethanolamine
 - Benzyl alcohol
 - Stearyl or isostearyl alcohol
 - Phenoxyethanol
 - Myristyl alcohol
 - Propylene glycol
 - Benzalkonium chloride
 - Methylchloroisothiazolinone/methylisothiazolinone
 - Methylidibromoglutaronitrile



Allergens identified by patch testing at NIOH OSD clinic

- Most common preservatives:
 - Methylisothiazolinone
 - MCI/MI mix (Kathon)
 - Methyldibromoglutaronitrile (MDBG)
- Fragrances
 - Mixes I & II
 - Balsam of Peru
 - Sesquiterpene lactone

MCI/MI Allergic
patients





Other factors that aggravate the skin

- Certain hand hygiene practices can increase the risk of skin irritation and should be avoided
 - Washing hands with soap and water immediately before or after using an alcohol-based product
 - Unnecessary & it removes the natural sebum layer that protects the skin
 - Increases skin irritation and dryness
 - Reduces bactericidal efficacy of skin barrier



.....Still other factors which can aggravate skin irritation

- Donning gloves while hands are still wet from either washing or applying alcohol
- Wearing gloves for excessively long periods of time (Wuhan)
- Number of times & when hands are washed (5 instances during patient care; many other occasions)
- Lack of a good hand-care regime



Hand Hygiene Recommendations

- Although Alcohol-based hand antiseptics (ABHA) can cause dryness and skin irritation
 - Substantially reduce bacterial count on hands
 - Better tolerated than soap and water - gentler on skin than frequent soap and water washes
 - Preferable for hand hygiene when hands are not visibly soiled
 - Require less time than handwashing
 - Are more accessible
 - Are self-drying
 - **NB** that hand sanitisers contain skin emollients (moisturisers)




Hand-Care

- In addition to appropriate cleansing agents, NB that there is good hand-care
- Use of moisturising products essential to:
 - Restore the ability of the stratum corneum to absorb, retain and redistribute water
 - Help to maintain the integrity and appearance of the skin
 - Recommended for treating dry skin and mild dermatitis
- Important that moisturisers are acceptable to users to ensure regular use
- Should be in tubes or dispensers (prevent contamination)

Hand-care at work and at home

- HCW should use water-based creams at work
 - Oil-based moisturisers may have deleterious effects on the integrity of rubber gloves
 - Barrier creams (occlusive) not recommended for HCW
 - Efficacy of these products is equivocal
 - Efficacy of antiseptic agents used in the facility
 - May contain sensitisers
- At home:
 - Use of ointments (80% oil and 20%) [recommended for extremely dry skin and for treating mild dermatitis]
 - At night ointment can be applied under cotton or loose plastic gloves – helps to replenish barrier
- Repeated hand-sanitising at malls/shops
 - Ensure regular moisturising
 - If barrier is damaged – possibly wear gloves



“Healthy Skin is a prerequisite for effective hand hygiene, since open wounds and damaged, cracked skin may impair thorough disinfection” Harness JC; et al



Importance of Personal Protective Equipment (PPE)

- COVID -19 focus on protecting oneself & others
- Protective measures include –
 - Surgical & cloth masks (a barrier to splashes, droplets, and spit)
 - Goggles
 - Face shields (Adjunct PPE)
 - Respirators
 - Gloves
 - Gowns
 - Coveralls
- Provide protection **but** change the environment of the body
→ adverse effects

Reactions to PPE

- Skin reactions include

- Irritation
- Allergic reactions
- Acne



- Physical discomfort –

- Heat
- Dehydration
 - Headaches
 - Dizziness



- Respiratory symptoms

- Rhinitis
- Asthma
- Allergies (latex)



- Pressure injuries

- Bridge of the nose
- Forehead
- Behind ears



Location – Country /area	Population/ Study size	Skin damage reported	Prevalence
Hubei, China	542 hospital Physicians, nurses in tertiary hospitals	Lesions of nasal bridge; Cheeks Forehead	84,1% 78,7% 57,2% (97% overall)
Wuhan	376 Doctors & nurses in 5 University & 5 regional hospitals	Cheeks Nasal bridge	75,4% 71,8% (74,5% overall)
28 Provinces in China	4306 Medical staff in 161 hospitals	Device related pressure injuries (DRPI) Skin tear	30,0% 2,0% (Overall 42,8%)
Hubei Province, China	61 doctors & nurses	N95 damage: Nasal bridge Facial itching Skin damage Latex gloves: Itching Rash Chapped skin	68,9% 27,9% 26,2% 31,2 23% 21.3% } 95.1% Overall
Singapore, Tau Tock Seng Hospital	322 HCW	N95 masks Gloves Gowns	35,5% regularly reported 21,4% 4,1%
South Wales, UK	Observational case series from a district hospital in Wales (72 workers)	Pressure related facial symptoms Worsening of pre-existing dermatological conditions	4% 23,6%
London and Manchester, UK	2 NHS Foundation Trust clinics in England (146; 85 workers)	Facial dermatoses	46,3% 3,7%

Irritant reactions from wearing gloves





INCORRECT GLOVES



Reactions to glove material

Urticaria



Allergic contact dermatitis – Thiuram



Allergic contact dermatitis – Thiuram;
IgE to latex



Reactions to latex gloves



Latex allergy – respiratory symptoms

- Asthma
- Anaphylaxis

Investigation of reactions:

- Multiple causation
- Thorough
 - Latex allergy
 - ACD – not only rubber
 - Other e.g. fragrances, preservatives
 - Atopy
- Intervention measures
 - Change in gloves
 - Move to different area
 - Other exposures

Reactions to facial protection



Reactions to Respirators

- Long hours of wearing
- Very tight fit –(Fit test)
- Dressings?
 - Absorbent
 - Hydrocolloidal
 - Barrier film (not affect fit)
- Limit time of wearing
- Other masks when possible
- Use of emollients

Allergic reaction to respirator



Allergy to
mercaptobenzothiazole –
accelerator in rubber





Reactions to masks - Acne



Prevention –

- Routinely cleaned & moisturised
- Emollients 1hr before using facial PPE
- Limit wearing time

Device related pressure ulcers

Skin care very NB to limit DRPU

- Using emollient e.g. petroleum jelly
 - Lubricant & protects skin from sweat
- Substitute goggles for face shield



Realities

“Skin barrier dysfunction and potential microbiota disorder of inflammatory facial dermatoses might make patients more vulnerable to mask side effect”

“High mask incompliance out of discomfort, could cause transmission of pathogens”

“mild abrasions on the face, may increase the likelihood of face touching while not using PPE or inadvertent PPE protocol breaches....”

“Protection of the hands is a 24hr/7day a week commitment



Considerations to prevent adverse reactions

- PPE should fit properly
 - Gloves too tight – dexterity is limited; could tear during use; cause pressure & increased perspiration
 - Gloves too loose - will do a poor job keeping out potential pathogens and could get caught in equipment
 - Respirators – not properly fitted – damage to skin &/or reduced protection
 - PPE must be appropriate for the exposures

.....More considerations to prevent adverse reactions

- Provide protection for required time (breakthrough time; permeation; degradation)
 - » Use of mixtures of chemicals
 - » Contaminants which may affect the integrity of the gloves
- NB to consider cost of OSD vs quality PPE
 - Treatment
 - Time off work
 - Job loss
 - Re-training

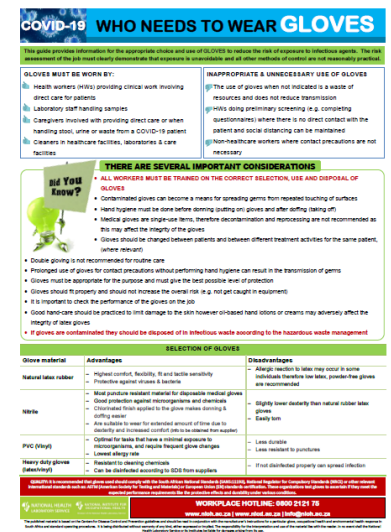




.....even more considerations to prevent adverse reactions

• Education and training material

- Training on the proper use & care of all PPE & exposures in the workplace is essential
- Awareness of early symptoms of skin problems
- Good housekeeping, work practices, and self-care must be emphasised



To end.....

Use of PPE can provide very necessary protection but it can also cause adverse health reactions & all possible measures need to be put in place to prevent damage which can occur



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