

Hair, nail and skin changes during COVID 19 era

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Abstract

Background In December 2019, unexplained cases of viral pneumonia caused by a new coronavirus pathogen (SARS-CoV-2) began to be reported in China, and the disease was called Coronavirus Disease 2019 (COVID-19). Guidelines issued by WHO and other agencies have been consistent about the need for physical distancing, respiratory protection with a face mask, hand wash, and use of disinfectant to clean frequently touched surfaces daily. Our aim is to identify the possible effects of the protective measures against COVID19 virus on the hair, nail and skin.

Objectives To identify the possible effect of the protective methods against COVID19 virus on the hair, nail and skin.

Methods This study was conducted as a prospective cross-sectional study using an online questionnaire. The participants were from different Iraqi cities. The study was carried out from the 1st of June to the end of August, 2020.

Results There were 1893 cases that reported different skin complains, 55% complained of hand dermatitis, and about 64% of cases showed mask marks and rashes. And more than 1228 patients complained of notable hair loss. A significant number of participants reported brittle nails and dullness.

Conclusion With balancing the benefits and the harm with support of strategies to protect the skin (using products devoid of common allergens, using products with added moisturizers, and applying moisturizers immediately after hand washing or before gloves use and healthy diet).

Key words

Hair, nail, skin changes, Covid-19.

Introduction

In December 2019, unexplained cases of viral pneumonia caused by a novel Coronavirus pathogen (SARS-CoV2) began to be reported in China, and it was called Coronavirus Disease

2019 (COVID-19).¹ On the 24th of February 2020 first case of COVID-19 had been reported in Iraq.² On March 11, 2020, World Health Organization (WHO) reported COVID-19 as a pandemic disease. At the end of July 2020, Iraq was the second place in the rank of coronavirus in Arabian world, with about 134,722 cases and 5,017 deaths.

The entire world has been fighting with the disease till now. No definite treatment has been recommended, but the only way to prevent the

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virus spread is to use protective methods. The guidelines for Coronavirus protection dispensed by WHO, the US CDC “Centers for disease control and prevention”, and other agencies have been recommended physical and social distancing of (1–2m), usage of a face mask, hand wash (with soap and water for at least 20 seconds) and use of disinfectant to clean frequently touched surfaces daily.³

Hand and body cleansing products are presented in various forms (liquid, bar soaps, synthetic detergents, antiseptic one, alcohol-based hand sanitizers, and so on), even though their effectiveness to fight the virus they have a significant harmful effect on the skin by altering skin-barrier integrity and function and increase the possibility of skin disease.⁴

Methods

This study was an observational cross-sectional study. It was fulfilled by using an online questionnaire. The participants were from different Iraqi cities. It was carried out from the first of June to the 31st of August, 2020. The questionnaire had the general information of all the individuals such as age, gender, residence, occupation, questions about number of hand wash, detergent use, hair loss, nail changes, skin changes, and if previous skin disease had been recorded. All the participants were asked questions about before and after the era of pandemic disease and any comment add and picture sent for any suspicious lesion. We use Google Forms to make the questionnaire. Three dermatologists and family medicine physicians involved to prepare the proper questions. Exclusion criteria were: positive patients of COVID-19, any previous dermatological disease, any drug, and if any medical disease.

Power analysis revealed 2029 respondents in the study which were larger than the acceptable

sample size to increase the reliability of the findings from this study. The qualitative results were given as number and percentage, a value of ($P < 0.05$) was accepted as statistically significant. All data was analyzed using Excel windows 10 and the P-value measured manually.

Results

This study was conducted as a prospective cross-sectional study. There were 2029 participants from 18 Iraqi cities. From 1st June to 31st of August. About 32 patients had coronavirus and 104 participants having contact to COVID-19 positive patient were excluded. So total were 1893 participants, 832(56.1%) were men, while 1061(43.9%) were women. The average age was found as 25 ± 12.4 (age range 16-55) years.

We sort the information according to parts affected as in table 1, 2, 3 and 5. We found if there were any complain or skin lesions appeared in the era of COVID associated with the use of protective measures (frequent hand wash, face mask, detergent use and number of hair wash in a week and so on).

There were 1893 cases that reported different skin complains so we sort them according to number of hands wash for less than or more than 4 times per day to identify a possible effect of frequent hand wash on the skin as it is shown in **Table 1**. Also, we reported that there were about 66% of the participant change their ordinary hand wash with alcohol-based hand sanitizers, and 54% of cases used the disinfectant gel more than 6 times per day. Also, we try to evaluate the

Table 1 The effect of frequent hands wash.

	<i>Frequent hands wash/ day</i>	
	<i>> 4 times</i>	<i>< 4 times</i>
Skin dryness	1042 (55%)	851 (45%)
Skin redness	348 (18.3%)	1545 (81.7%)
Skin sensitivity	1345 (71%)	548 (29%)
Itching	756 (39.9%)	1137 (60.1%)
Skin swelling	426 (22.5%)	1467 (77.5%)

p value < 0.05%

Table 2 The effect of the use of face mask for more or less than 3 hours per day.

	<i>Using of mask for every time went outside for 3 hours variant</i>	
	<i>>3 hours/day</i>	<i><3 hours/day</i>
Mask marks Commedon and acne lesions under the mask	1210 (64%)	683 (36%)
	1367 (65%)	731 (35%)

p value significant < 0.05%.

Table 3 The hair disorders in this era.

<i>The dermatological condition</i>	<i>Yes No. (%)</i>	<i>No No. (%)</i>
Hair loss	1228 (64.8%)	665 (35.1%)
Dull hair	1107 (58.5%)	786 (41.5%)
Broken hair	1274 (67.3%)	619 (32.7%)
Scalp itching	1036 (54.7%)	857 (45.3%)

p value < 0.05%

effect of face mask used in this era as protective and possible skin effect as it is shown in **Table 2**.

We asked if there were any hair complains in the participates, about these symptoms about number of hair wash per week as in **Table 3, 4**.

We also assessed the effect of hand wash and wearing gloves and using detergent on the nails integrity and character as shown in **Table 5**.

Discussion

The emergence of novel pathogens has always postured significant challenges to global health around the world.⁵ With excessive use of many products and effects on the skin barrier we found that there was a significant effect on hair, skin, and nail. One of the many ways, which were recommended to prevent the spread of COVID-19 virus was frequent and effective hand washing and WHO recommended guidelines for the prevention of this virus.⁶

Allison E. *et al.* found in their Meta analysis that the usage of the soap with hand-hygiene

Table 4 The effect of frequent hair washes per week on hair loss.

<i>Hair loss</i>	<i>Once / week</i>	<i>Twice</i>	<i>More than 2</i>
yes	124	209	895
no	312	198	155

Table 5 The effect of frequent hand wash on the nail integrity and character.

	<i>Frequent hands wash/ day</i>	
	<i>> 4 times</i>	<i>< 4 times</i>
Brittle nails	1059 (55.9%)	834 (44.1%)
Dull color of nail	984 (51.9%)	909 (48.1%)
Thinning of nail plate	1139 (60.2%)	754 (39.8%)

education is advisable to prevent both GIT and respiratory illnesses, but many side effects had been observed.⁷ One of the major components of a healthy skin barrier is the stratum corneum, which is composed of keratin and lipids and acidic PH of the skin “acid mantle” (PH 4.7).^{4,8} According to Marchionini and Haus Knecht, the structural integrity and the buffer towards harsh environmental substances (including soaps and detergents, cold water or hot water, mild lubricants, long time gloves usage, friction, wet environment, and thick paper towels) can undesirably affect skin-barrier functions and its bacterial flora.^{9,10}

Ohman and Vahlquist identified that there are many enzymes in the skin working in optimal PH (5.6) which will change with the use of cleansing agents because it induces inflammatory reaction with PH (9.6) lead to skin dryness and desquamation which had been seen significantly in our research (P value less than 0.05) and about 18.3% of cases showed redness and 71% complained of skin sensitivity which they didn't have before the era of CORONA with the excessive use of disinfectants, 55% of patients reported skin dryness, which Chandler W *et al.* supported in their research that contact dermatitis might increase the possibility of occurrence with frequent hand washing, combined with chemical and physical irritants (like detergents & hot water) results in

keratinocyte release of pro-inflammatory cytokines that instigate skin barrier disruption, cellular changes, additional cytokine release & proteins are denatured. When the barrier of the skin is disturbed, this will exhibit increased transepidermal water loss (TEWL) and more irritants and allergens can penetrate the epidermis, leading to propagation of an inflammatory response all that lead to hand dermatitis.^{4,11,12}

There's probable increase in the incidence of dermatitis from frequent hand cleaning in response to COVID-19 protection roles. The CDC preferred that every person should wash their hands with soap and water for at least twenty seconds.^{13,14}

In this study, we tried to assess the possible effects of face mask, we found that 65% of participants complained of comedons and acne and about 54% of them also complained of rash due to mask pressure all that had been supported by Leelawadee Techasatian *et al.*, as in their literature reported that about (54%) of the participant reported face mask adverse skin reactions. The most significant adverse skin reaction was acne followed by rash, also Kaihui Hu supported that in their research.^{11,15,16}

Hair is a focal part of the body petition and it looks like a health pointer, on one hand, hair texture and shine are mostly related to hair surface properties while on the other hand, the integrity of the hair is due to its cortex. Possibly washing the hair too frequent in a week might remove an extra amount of sebum from the hair follicles, which then becomes harmful to the next hair growth cycle, as was found by exposing Rhesus Monkey hair to shampoo materials reduced hair cortisol content, likely due to leakage of a part of the hormone from the interior of the hair shaft.^{17,18} Our results supported that there was a significant

relationship between number of bathing per week and hair loss (about 68% of the patient complained of hair loss. And we found that most of the patients complained of brittle hair and loss of its brightness as shiny hair and having smooth feel and fresh-cut ends are generally directed toward healthy hair, as it's shown in our research, that more than 50% of the patient had brittle, dry and dull hair.¹⁸

Regarding nail involvement affected by recurrent hand washing and using sanitizer, about 60% of cases showed brittle nails. Brittleness of the nails is identified as nails that split, flake, and crumble, become soft and lose elasticity as Chessa, M.A *et al.*, gave the definition in their work and reported that normal nails contain 5% lipids, as we mentioned already that frequent hand wash affects the hand PH also decreases water content in the nail plate (<16%).^{11,19}

Van de Kerkhof reported that frequent moisturizing and drying may play an important role in housewives, hairdressers, and healthcare employees who habitually wet & dry their hands lead to fractures between nails plate "onychocytes".^{20,21}

Conclusion

The hand wash, wearing mask, using detergent and disinfectants are necessary to lower the COVID-19 transmission. But with many effects of these measures, we have to balance between the benefits and the harm, with support of simple strategies to protect the skin (using substances that are devoid of common allergens and irritant materials, usage of different emollients after hand washing or before putting gloves). Lastly, a healthy diet & lifestyle improves the immune system responses.

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